



**U.S. Army Research Institute
for the Behavioral and Social Sciences**

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**Combined Arms Operations at Brigade Level,
Realistically Achieved Through Simulation II
(COBRAS II):
Report on Development and Lessons Learned**

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FOREWORD

In spite of significant budgetary restraints, the U.S. Army faces the challenges of maintaining combat readiness and preparing for the battlefield of the 21st century. In fiscal year 1994, Congress appropriated funding for the Virtual Brigade Training Program (Department of Defense, October 1993). Shortly thereafter, program development was assumed by the Force XXI Training Program (FXXITP).

Several training efforts have been initiated under the FXXITP. One of those efforts is called Combined Arms Operations at the Brigade Level, Realistically Achieved Through Simulation (COBRAS). This work has been developed by the U.S. Army Research Institute for the Behavioral and Social Sciences and the U.S. Army Armor Center (Memorandum of Agreement entitled "Force XXI Training Program [i.e., Virtual Brigade Training Program]," June 1994). The first COBRAS effort -- COBRAS I, developed two types of exercises designed for the staffs of inexperienced, conventionally-equipped brigades: vignettes for segments of the staff and a larger Brigade Staff Exercise (BSE) focusing on the primary staff members plus the staff responsible for combat support (CS) and combat service support (CSS). Both exercise types offer practice and feedback opportunity in combat fundamentals.

The second COBRAS effort - COBRAS II, the subject of this report expands on the COBRAS I training research and development, implementing lessons learned and satisfying training needs (i.e., training for staff personnel linking the brigade staff and additional CS and CSS systems) exposed during that and related, concurrent efforts.

This report discusses the background of the COBRAS II project and documents the design and development of the resulting training program. Also contained are lessons learned for future development efforts, and training issues that will likely demand attention in the near future. Force XXI policy makers and training developers will find this report useful in the course of continuing steady progress toward Force XXI goals in training and readiness.

ZITA M. SIMUTIS
Technical Director

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This report reflects the efforts of a team of research scientists, military experts, performance analysts, training developers, simulation systems experts, and administrative support personnel. During the course of the 21-month effort to develop the training, some 60 Army Research Institute for the Behavioral and Social Sciences (ARI) and contractor personnel were involved in design, development, implementation, and evaluation. All contractor personnel were staff from four organizations that form the Combined Arms Operations at Brigade Level, Realistically Achieved Through Simulation (COBRAS) Consortium: the Human Resources Research Organization, Raytheon (formerly Hughes Training, Inc.), TRW-BDM (formerly BDM Federal, Inc.), and Litton-PRC, Inc.

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COMBINED ARMS OPERATIONS AT BRIGADE LEVEL, REALISTICALLY ACHIEVED THROUGH SIMULATION II (COBRAS II): REPORT ON DEVELOPMENT AND LESSONS LEARNED

EXECUTIVE SUMMARY

Research Requirement:

In 1994, the Army Research Institute for the Behavioral and Social Sciences, in coordination with the Force XXI Training Program and the U.S. Army Armor Center, launched a research and development effort designed to help brigade staffs become proficient in the combat fundamentals that will be required on the digital battlefield. This effort, titled *Combined Arms Operations at Brigade Level Realistically Achieved through Simulation (COBRAS)*, is developing and evaluating structured, simulation-based training programs and strategies to address the training need.

The predecessor project (COBRAS I) developed two types of exercises: a Brigade Staff Exercise (BSE) and a set of brigade staff vignettes (Graves, Campbell, Deter, & Quinkert, 1997). The COBRAS II project, the subject of this report, was to expand on that work. The objectives of the COBRAS II project were to: (a) develop a BSE that provides structured training for a wider audience, (b) develop additional vignettes that support training for additional audience, (c) formatively evaluate the newly-developed training, and (d) from that evaluation, provide lessons learned and insights into the advancement of the Force XXI training strategy.

Procedure:

Working from the COBRAS I products, developers identified precisely the new training audience positions, revised the scenario to provide performance opportunities for the full audience, and revised the exercise architecture based on lessons learned in the initial project. This foundation was then used to construct the training support package (TSP) materials for both the BSE and the vignettes.

The comprehensive formative evaluation was ongoing, with numerous internal and external reviews of decisions and products. Two implementations of the BSE supported improvement to the quality and functionality of the training model and TSPs. Evaluation of the vignettes depended on small scale pilot tests, supplemented by intensive reviews and proofing within the project staff.

Findings:

The design, development, and evaluation processes described above combined to produce structured exercises and TSPs consistent with project requirements. Products include this report and other documents relating to the development methodologies and the performance

requirements (i.e., brigade staff task lists) produced during the project, in addition to the TSP materials themselves.

The BSE provides an opportunity for the brigade commander, his principal staff, and the special staff who serve as links between the brigade and its key combat support and combat service support systems to practice their roles during all phases of a three mission scenario. The 14 vignettes were developed to provide structured practice opportunities for selected segments of the brigade staff. As a set, the vignettes cover general staff events (e.g., plan brigade rear operations) that occur during the three mission phases.

Lessons learned during the project and insights into anticipated training needs are presented to assist training developers, including Force XXI policy-makers, as they continue to advance and promote the Force XXI Training Program. The lessons focus on the development and implementation of structured simulation-based training, as well as on the potential value of such programs. Insights are structured around ongoing work under a second follow-on project, COBRAS III, and address some training needs that may surface in the not too distant future.

Utilization of Findings:

This report presents the history of the development of the COBRAS II program and the lessons learned during the project's duration. As continued emphasis is placed on providing low-resource, cost-effective training for U.S. Army staff personnel, this report can lead those training development efforts into the selection of effective design and implementation strategies.

COMBINED ARMS OPERATIONS AT BRIGADE LEVEL, REALISTICALLY ACHIEVED THROUGH SIMULATION II (COBRAS II): REPORT ON DEVELOPMENT AND LESSONS LEARNED

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**COMBINED ARMS OPERATIONS AT BRIGADE LEVEL, REALISTICALLY
ACHIEVED THROUGH SIMULATION II (COBRAS II):
REPORT ON DEVELOPMENT AND LESSONS LEARNED**

INTRODUCTION

Military forces of today and the 21st century are at a decisive inflection point in how they do business. It is characterized by the transition from mostly analog battlefield systems to operations with the new digital systems. However, before the transition from conventional to digitized systems and organizations can be achieved, Army leaders have forecast the need to strengthen basic combat skills, with an emphasis on command, control, and communications (C3). In the face of reduced monetary and personnel resources, they are looking to simulation-based training to complement institutional training and live field training exercises in preparing soldiers for the demands of future missions, organizations, and weapon systems.

One of the first such programs was the Virtual Training Program (VTP)¹ developed as a research and development (R&D) product by the Army Research Institute for the Behavioral and Social Sciences (ARI) in 1993-1994. The VTP provides Army National Guard and active component (AC) units with high-quality, time-compressed structured training in virtual and constructive environments (Hoffman, Graves, Koger, Flynn, & Sever, 1995). Both offensive and defensive exercises were developed for the battalions, battalion staffs, companies, and platoons.

In 1995, ARI undertook another effort, *Combined Arms Operations at Brigade Level, Realistically Achieved through Simulation*, which was referred to as COBRAS. The COBRAS project developed structured simulation-based training exercises for the staffs of conventional mounted brigades. The exercises included a Brigade Staff Exercise (BSE) and vignettes for subsets of the brigade staff (Graves, Campbell, Deter, & Quinkert, 1997).

The follow-on project, COBRAS II, is the subject of this report. Expanding on the products created during the original project², the COBRAS II effort includes an expanded BSE with a wider training audience that, in effect, replaces the initial (COBRAS I) BSE, and additional brigade staff vignettes.³

¹ The program was originally known as the Reserve Component Virtual Training Program. As active component (AC) units and institutional training managers became interested in using the program, the "Reserve Component" designation was dropped.

² In this report, the original COBRAS development work will be referred to as COBRAS I, to ensure the distinction between the two efforts.

³ The COBRAS II project also enhanced the VTP by adding opportunities for training combat support (CS) and combat service support (CSS) functions. This COBRAS II battalion-level work is described in Hoffman's report, *Combat Support and Combat Service Support Expansion to the Virtual Training Program SIMNET Battalion Exercise: History and Lessons Learned* (1997). The products of that effort reside with the VTP observer/controller (O/C) Team of the 16th Cavalry Regiment, Fort Knox.

Purpose of the Report

This report documents the development process and lessons learned during the COBRAS II project. It is addressed to three audiences: the sponsors of training development programs, the developers of the training programs, and those policy-makers who are responsible for Army training today and in the future. In addressing those audiences, the report has three objectives:

1. to detail the history of the development effort, from the initial design activities through the production and delivery of the final training support package (TSP) materials;
2. to describe the resulting training exercises and TSPs, focusing on the unique aspects of the COBRAS II versus the COBRAS I program designs; and
3. to present lessons learned from the project, provided to assist Force XXI policy-makers as they continue to advance the program, and to aid developers of other structured simulation-based training programs.

Organization of the Report

This report is organized in seven sections:

- *Section 1: The COBRAS II Project.* Describes the early stages of the project in terms of project initiating circumstances, the technical objectives, and training program design.
- *Section 2: COBRAS II Development Plan and Evaluation Plan.* Describes the COBRAS II project's development methodology and presents the timeline of project events.
- *Section 3: Development of the Brigade Staff Exercise.* Describes the development of the BSE in preparation for the trial implementation, highlighting how and why the COBRAS I BSE was modified from its original version to achieve the objectives of the COBRAS II project.
- *Section 4: Trial Implementation of the Brigade Staff Exercise.* Describes the BSE trial implementation and its findings, and discusses the actions taken to improve the exercise as a result of the trial.
- *Section 5: Development and Pilot Testing of the Brigade Staff Vignettes.* Describes the development of the vignettes. Modifications to the COBRAS I development processes are highlighted. Also describes the vignette pilot implementations and their findings, and discusses the actions taken to improve the vignettes as a result of the pilots. Included is a discussion of how certain COBRAS I vignettes were re-examined and modified according to the COBRAS II development methodology.
- *Section 6: Lessons Learned for the Development of Future Training.* Summarizes lessons learned that may apply to future training development projects. Most of the lessons relate to the construction and content of TSPs for COBRAS-like programs.
- *Section 7: Future Directions.* Discusses the second COBRAS follow-on effort, COBRAS III, and project notes regarding future development efforts.

Appendix A provides definitions of the acronyms used in this report. Appendix B, *Foundations: Overview of the COBRAS I Program*, describes the original project in order to provide a brief background for this report. It includes a synopsis of the COBRAS I program including descriptions of the exercises and TSPs. The discussion also summarizes certain aspects of the COBRAS I development methodology that influenced or supported continued development in the COBRAS II effort. Finally, Appendix C provides a description of the basic methodology for development of structured simulation-based training and a description of the specific use of the methodology for development of structured, small group exercises (vignettes).

SECTION 1: THE COBRAS II PROJECT

The planned scope and activities of the COBRAS II project were outlined by ARI, the United States Army Armor Center (USAARMC), and the Force XXI Training Program during the early stages of the project. During this time, the conceptual foundations of the program were solidified as development objectives and requirements. This section describes the early stages of the project, in terms of the project initiating circumstances, the project's technical objectives, and the training program design.

Project Initiation

In early 1994, with the support of the Senate Appropriations Committee, the U. S. Army was directed to “. . . expand the existing simulation facilities at Fort Knox, develop a training strategy, use it to enhance the readiness of the 194th Separate Armor Brigade, and evaluate the effectiveness of these simulations and this new strategy” (Department of Defense, October 1993). Congressionally-identified funding was provided to the ARI - Armored Forces Research Unit at Fort Knox. The resulting program, known as the Force XXI Training Program, was seen as an Army-wide program for integrating virtual, constructive, and live simulation-based training into the Force XXI plan for enhancing combat readiness. The effort, conducted by ARI, was titled “Force XXI Training Program for the Conventional Mounted Brigade”⁴ and began in January 1995.

The COBRAS II project, being a direct extension of the earlier effort, is the product of a continuance of the congressionally appropriated funding. Again, ARI defined the requirement in a statement of work ([SOW] ARI, 1995), and a technical response (Human Resources Research Organization [HumRRO], 1995) was prepared to detail the approach to meeting the requirement. That technical response was followed by preparation of the research plan (HumRRO, Hughes Training, Inc., BDM Federal, Inc., & PRC, Inc., 1996), which further delineated the courses of action to be taken to fulfill the requirements of the SOW. It also provided additional detail regarding the proposed design of the COBRAS II program.

The SOW, technical response to the SOW, and research plan laid down the first detailed expectations for the COBRAS II project. These expectations, which represent the purpose and specifications of the program, are described below.

Project Purpose

The initial COBRAS I program was designed to improve the decision-making processes of the brigade headquarters through the use of simulation, while at the same time reducing the amount of time and number of personnel required to prepare for and support the training. At a more abstract level, however, the program represented a test-bed for training concepts and training technology. That is, it provided an initial architecture for addressing collective training needs for a conventional brigade staff and the linkages to higher and subordinate echelons.

⁴ One more name change occurred in the spring of 1995, when the program title Combined Arms Operations at Brigade Level, Realistically Achieved Through Simulation, and its acronym, COBRAS, came into common usage.

As a training program, the COBRAS I exercises provided the conditions for brigade staff members to practice decision-making, communications, synchronization, and integration processes among themselves and with other echelons. However, only 11 of the brigade staff members were included in that initial effort. The research requirement for the COBRAS II project was to expand the exercise to include five more members of the staff, representing communications, chemical, military police (MP), army aviation, and military intelligence (MI) and electronic warfare.

COBRAS II Program Design Synopsis

As in COBRAS I, the COBRAS II exercises were to be designed according to the principles of structured training. These principles include: (a) a focus on performance of selected critical tasks, (b) standardized exercise control to ensure task performance, (c) standardized feedback to correct and reinforce task performance, and (d) exercise support by means of a comprehensive TSP.

The following synopsis provides a brief overview of the exercises and materials to be developed. It describes the types of exercises, the characteristics of the program's tactical scenario, the program's instructional design characteristics, and the characteristics of the TSPs. The program was to be a direct expansion of the COBRAS I program; that original program is described in Appendix B to provide a more complete background.

Exercise Types

The SOW called for development of exercises (i.e., a BSE and vignettes) of the same type as were created during the COBRAS I effort. Like those exercises, the new exercises were to be differentiated by the scope of their focus.

- The BSE was to be a large scale training exercise that would immerse the brigade commander, selected members of his staff, and key leaders with links to various battlefield operations systems (BOS) in a multi-mission scenario covering all phases of the missions (plan, prepare, and execute, including consolidation and reorganization).
- The vignettes were to be short (less than one training day) structured exercises targeting particular groups of brigade staff members on specific aspects or events within the context of the plan, prepare, and execute phases of tactical missions. At least two vignettes were to target the vertical linkage between the battalion and brigade echelons.

Tactical Scenario

Both types of exercises were to be based on a single scenario that would represent a variation of the base scenario produced during the initial COBRAS project. In that scenario, a conventional mounted brigade is opposed by a Krasnovian enemy operating according to the conventional Soviet-style threat specifications described in the U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (PAM) 350-16 (Department of the Army [DA], 1994) and U.S. Army Combined Arms Center & Fort Leavenworth PAM 350-1 (DA, 1993).

The scenario includes three missions (i.e., movement to contact [MTC], area defense [AD], and deliberate attack [DATK]). These three missions are incorporated in a storyline

covering a continuous war, where the outcomes of one mission determine the location and general conditions for the next mission. The scenario is set on National Training Center (NTC) terrain and covers the plan, prepare, and execute phases of each mission, with a focus on CS and CSS operations. The COBRAS II requirements dictated that the details of the scenario be altered, however, in order to incorporate events (e.g., a chemical threat, an aviation mission) that would stimulate activities for the new training audience members.

Instructional Design

The instructional design of the program was to be consistent with the design of the initial COBRAS program, and was to accommodate both the expanded training audience and the lessons learned in COBRAS I. The exercises were to be exportable and implementable without the benefit of a dedicated observer/controller (O/C) team. This meant that all participants, including O/Cs, would have to come from within the training brigade or its division, or from a sister brigade. It also meant that the TSP would be completely self-contained, requiring no contractor support team to explain how to implement the program. The training objectives and performance observation and feedback systems were to be based on the design of the COBRAS I program.

Training Support Packages

The development of the COBRAS II TSPs was to start with the materials developed in the COBRAS I program. The model for the BSE included a single TSP that would be flexible enough to be used under different implementation configurations. The vignette model included an individual TSP for each vignette, linked together in a single training management component.

It was anticipated that new ideas, information, and instruction would emerge during BSE and vignette development, because of the expanded training audience requirements, and would be incorporated into the TSPs. Additionally, job aids, guides, and task lists would be created, as they were found to be beneficial or necessary, during the project.

Development Link Between Projects

The timing of the two projects eased the transition from COBRAS I to COBRAS II in two ways. First, the trial implementation of the COBRAS I BSE did not occur until after the conclusion of the COBRAS I project. Second, the development of the COBRAS I vignettes for constructive simulation environments was not completed during the timeframe of the first project, but was assimilated into the development of the COBRAS II vignettes.

The final trial of the COBRAS I BSE was conducted with members of the 2nd Brigade, 1st Infantry Division (ID) (Mechanized), Fort Riley in August 1996. In fact, this was the only implementation of the COBRAS I BSE with an intact brigade staff. The other implementation was an early pilot test conducted with members of the 16th Cavalry at Fort Knox, who were generally battalion-level personnel roleplaying a brigade staff.

At the time of the COBRAS I final trial, the TSP was complete and had undergone thorough review, in terms of tactics and instructional quality issues, by the brigade-level subject matter expert (SME) personnel on the COBRAS team as well as external reviewers. Because the project had already been concluded, and because the COBRAS II BSE was to replace the COBRAS I BSE, the strategy for utilizing trial results was to incorporate it in designing and

developing the COBRAS II exercise and TSP, rather than using the information to revise the COBRAS I products.⁵

The COBRAS I project's effort to develop two vignettes to be conducted in constructive simulation environments was delayed, in part due to difficulties in gaining access to the simulation systems for development and tryout, and also because of the difficulty of the task and the unexpected time required to develop short duration exercises that use constructive simulation. These factors extended the development time frame. Early in the COBRAS II project, the decision was made to complete development of the two COBRAS I simulation-based vignettes at the same time as the development of similar COBRAS II vignettes. It was expected that lessons learned during the development of the COBRAS II BSE and vignettes would contribute to improving both sets of simulation-based vignettes.

Summary

The COBRAS II design and development process was a carefully considered extension of COBRAS I work. From its inception, the COBRAS II BSE was intended to be the surviving exercise package, with the COBRAS I BSE relegated to archives and of historical interest only. However, the COBRAS II vignettes would be added to the previously constructed set. In the following section, the description of the COBRAS II development plan demonstrates clearly the similarities between the projects, in terms of the development methodology employed and the evaluation plan.

⁵ Although areas for improvement in the COBRAS I BSE materials were identified, none precluded the use of the BSE at an appropriate point in a brigade's training strategy.

SECTION 2: COBRAS II DEVELOPMENT AND EVALUATION PLAN

Like its predecessor, COBRAS II employed the methodology for the development of structured simulation-based training (C. H. Campbell, Campbell, Sanders, Flynn, & Myers, 1995), which was an outcome of the development of the VTP. COBRAS II, however, was able to benefit from lessons learned during the application of the methodology in the first COBRAS project, as documented in a revised methodology (C. H. Campbell & Deter, 1997; C. H. Campbell, Deter, & Quinkert, 1997).

Consistent with both versions of the methodology and the project SOW, the conduct of a formative evaluation was a vital aspect of the COBRAS II effort. The evaluation strategy required iterative implementations and reviews of the training throughout the course of its development. The findings from the evaluation were key to improving the program in terms of its task focus and implementation approach.

This section of the report presents the development method and timeline of the COBRAS II project. The three major topics include:

- *Development Methodology*: A description of the structured simulation-based training development methodology.
- *Formative Evaluation Approach*: Describes the evaluation approach and provides a brief introduction to the evaluation procedures performed during the COBRAS II project.
- *Development Process*: Describes the major project events and phases.

Development Methodology

The revised development methodology (C. H. Campbell, Deter, & Quinkert, 1997) was to drive the COBRAS II project's development of the BSE and vignettes. (For readers unfamiliar with the methodology, a description is presented in Appendix C.) Because the COBRAS II BSE represented an expansion of the COBRAS I exercise, a modified application of the methodology was employed to account for the fact that many aspects of the exercise (e.g., scenario, performance job aids) had been previously constructed and needed only modification. For the vignettes, however, the methodology was to be followed in full; that is, each of the vignettes was to be developed from an initial concept and would therefore require a full implementation of the methodology.

Formative Evaluation Approach

An integral and critical aspect of development was the formative evaluation. In the context of structured training development, "formative evaluation" means an ongoing cycle of examine-evaluate-refine. Formative evaluation occurs not after a project's completion, but during the development and initial implementations of the program.

The evaluation method for the COBRAS II program was based on the formative evaluation process outlined by Herman, Morris, and Fitz-Gibbon (1987), modified to be consistent with the method used in the creation of the VTP (Hoffman et al., 1995). The examine-

evaluate-refine cycle was executed throughout every phase of design and production to ensure that each component of the BSE and vignettes was functional, doctrinally correct, and consistent with other components.

The COBRAS II formative evaluation began informally with assessments of how to implement the initial design decisions consistent with and supportive of the project's objectives. For example, inclusion of additional training audience members would not be permitted to reduce the amount of training for the original training audience. As new concepts and training materials were developed, further assessments were made regarding how these products would support the training objectives and the further development of the program. These early evaluation activities were primarily internal to the development team, with briefings and guidance from the Force XXI Training Program and the USAARMC at critical decision points.

As development efforts proceeded, evaluation activities became more formal and comprehensive in nature, and increasingly significant external support was required. These included two types of evaluation activity: pilot exercises and trial implementations. The conduct and results of the evaluation activities are presented in Sections 4 and 5, and are summarized below.

For the BSE, pilot exercises were conducted with program developers assisted by developers of other structured training programs, simulation site staff, and military personnel from the USAARMC. Vignette pilot tests (conducted for only five of the vignettes) involved COBRAS developers, 16th Cavalry Regiment (Fort Knox) O/Cs from the VTP, and military personnel who were representative of the user population. In both cases, the focus was on assessment of the correctness and usability of selected components of the exercises.

Trial implementations usually involve users representative of the intended training participants, and are intended to allow evaluation of all components of the TSP. A trial implementation provides the forum for obtaining comprehensive user input regarding efficacy of design decisions, material functionality, user acceptability, and perceived training benefit. For the BSE, a trial implementation of one mission was conducted. None of the vignettes had a full trial implementation; instead, intensive project staff reviews were conducted.

The methods employed to collect information changed between the early informal evaluation processes and the pilots and trials. During early stages of development, the activities were relatively unstructured, and very little systematic data collection and analysis, in a traditional sense, was performed. Developers focused their attention on specific processes that they needed to assess. For example, in early simulation-supported tryouts of the scenario settings, the scenario contained initial conceptions of events that were to occur to drive the activities of the newly added target training audience personnel. The evaluations were aimed at determining if the simulation representation of the scenario would function as intended, providing cues and conditions as designed. A scenario might be tested, revised, and tested again in the same day; consequently, the focus was on obtaining and applying information rapidly.

During the latter pilot implementation, however, the data collection was more systematic and specific. Expected outcomes were targeted before each pilot or trial, in the form of specific questions, and evaluation instruments were designed to facilitate the collection of information to address the issues. Generally, pilot results included corrections, clarifications, resolution of

inconsistencies, amplifications or elaboration, deletions, and development of new materials and procedures as solutions to specific design problems.

The trial implementation was larger in scope than the pilots, and consequently involved more extensive formative evaluation procedures. The formative evaluation instruments for the trial were designed to support both observational and querying methods of data collection. The instruments generally included structured interview guides, evaluator guides, questionnaires, and group discussion guides.⁶

Each evaluation exercise was designed for timely documentation of results so that information could be disseminated quickly among the training developers. Involvement of the training developers in the observation process facilitated the extraction of findings and their translation into steps for modification. The observations and data from each exercise were organized and analyzed rapidly. The findings were then distributed immediately to the training developers and dialog sessions were organized, as necessary, to clarify and prioritize revision actions.

Development Process

As described above, the project followed the methodology for development of structured simulation-based training. The methodology is not a strictly linear procedure, but rather anticipates considerable modifications to design decisions as further development continues.

The first phase of the project stretched through the first eight months of the project. During this phase, various design decisions were delineated pertaining to the training audience definition, the training objectives, the scenario specifications, and the TSP architecture. Part of the reason for the seemingly inordinate time requirement was that the COBRAS I effort itself was still underway when COBRAS II work began. Thus information affecting COBRAS II decisions was still being generated by the COBRAS I project.

A critical event was the conduct of the trial of the COBRAS I BSE at Fort Riley, KS, in August 1996. During the trial, developers assessed the implementation with an eye towards how the exercise should be modified to represent a functional COBRAS II BSE.

The actual development of the COBRAS scenario, delineation of the training objectives, and construction of the TSP for the BSE and vignettes began well before the COBRAS I BSE was implemented at Fort Riley. The design processes of performance analysis and scenario construction were overlaid with TSP construction in order to meet a trial implementation set to occur only four months after the Fort Riley trial. The initial development of the BSE, along with the development of the scenario and task analyses is described in Section 3.

The trial implementation of the BSE, described in Section 4, occurred as planned at Fort Lewis, WA, in December 1996. Participants included members of the 3rd Brigade, 2nd ID and the 181st Brigade Reserve Training Detachment. The trial enabled developers to try out and obtain information on many aspects of the exercise, including the training objectives and tasks, but excluding the scenarios of the MTC and AD missions. After the trial, intense internal reviews of

⁶ Questionnaires were reviewed by ARI prior to the trial to ensure rights of the respondents would be protected. The questionnaires were assigned ARI Personnel Test Number 60-02.

the TSP were conducted, and data were analyzed and applied to improve the exercise. Feedback regarding the DATK (the mission executed during the trial) scenario, was extrapolated to assist in the refinement of the other two missions as well as the DATK.

The BSE received another significant evaluation with the same brigade along with O/C personnel from I Corps after the project was considered finished (in May 1997). Section 7 of this report describes this implementation and its application to future generation COBRAS programs.

Significant work on the vignettes began with identification of vignette concepts, or topics of focus. The more resource demanding vignette efforts were initiated after the BSE trial. It was during this period that the concepts and scopes of the individual vignettes were refined and the associated TSPs constructed. This initial vignette development work is described in Section 5 of this report.

Pilots of the vignettes involved military SMEs in armor, field artillery, chemical operations, CSS, and intelligence. The number of available U.S. Army participants and their expertise supported pilot implementation of only the five vignettes that focused on those areas. Again, however, the results were extrapolated and applied as appropriate to refine all the COBRAS II vignettes.

The internal reviews and refinement of the vignettes, after the pilots, was a particularly important aspect of their development. These reviews examined the extent to which each vignette facilitated training for its audience. At the conclusion of the reviews, each vignette had been substantively revised, relying heavily on the feedback received during the external pilots. The four vignettes designed for constructive simulation, including the two that were incomplete from the COBRAS I project, were the last vignettes to be completed.

Throughout the project, Force XXI Training Program and USAARMC were kept informed on the progress and obstacles by means of a series of in-process review (IPRs).

Summary

Within the development and evaluation plan described here, there were various considerations and decisions that shaped the final products. The next three sections of the report describe the design and development events, so that future developers may have a more complete picture of the processes and issues they may confront. Sections 3 and 4 describe the production of the BSE and Section 5 describes the production of the vignettes. Following the development-oriented sections, the report provides lessons learned and a description of the needs that remain to be addressed by future R&D.

SECTION 3: DEVELOPMENT OF THE BRIGADE STAFF EXERCISE

Because the developmental process for COBRAS II is very similar to the COBRAS I process (Graves et al., 1997), this report highlights the aspects of development and the exercise itself that were unique to the COBRAS II effort. It identifies those aspects of the BSE that were changed during the project, how they were changed, and the outcomes of those changes (i.e., new or revised TSP components).

This section deals with BSE development in preparation for the trial implementation at Fort Lewis, WA in December 1996. The topics covered include:

- *Designating the Primary Training Audience:* Describes how SOW identification of additional brigade functional areas for the exercise evolved into designation of the specific new audience members.
- *Designing the Tactical Scenario:* Explains how the COBRAS I scenario was altered to include scenario events that would cue the involvement of the new training audience members.
- *Designating the Training Objectives:* Describes the task identification and selection process and its products.
- *Designing the Exercise Architecture:* Presents the architecture of the COBRAS II BSE as it was prepared for the trial, and how it differed from that of the original BSE.
- *Developing the Training Support Package:* Provides a synopsis of the BSE TSP as it was prepared for the trial. Special focus is placed on describing how the COBRAS II TSP differed from the COBRAS I version.

Designating the Primary Training Audience

The first and most consequential decision in designing the BSE was identifying new training audience members. The SOW identified five functions that were to be represented by the new training audience: signal, chemical, MP, Army aviation, and intelligence and electronic warfare. Specific training audience positions to represent the functions were identified by reference to three criteria:

- First, the new audience members had to be active participants in the staff process, which was, from the beginning, the focus of the BSE. The members might be peripheral participants, or involved only in selected activities, but they *had* to be involved in the direct interaction that takes place among the brigade staff.
- Second, the new members had to be active throughout the majority of the exercise. This would ensure that the training benefit would be worth the time required for preparation and participation in the exercise.
- Third, each new audience member's role in the exercise had to be consistent with current and emerging (to the extent possible) doctrine.

The research into the various functional areas included thorough job analysis of the principal participants in each function, primarily through the relevant field manual and Army

training and evaluation program—mission training plan publications. As the selection process proceeded, developers consulted and maintained contact with representatives of the proponent agency schools (e.g., the U.S. Army Intelligence and Electronic Warfare School at Fort Huachuca). These relationships ensured that the most current doctrinal information was considered, thereby facilitating the decision-making process. Eventually, the following individuals were added as training audience members:

- the signal officer,
- the MP platoon leader,
- the assistant operations and training officer (S3)/chemical officer (CHEMO),
- the MI company commander, and
- the Army aviation liaison officer (AVN LNO).

Representatives of the Force XXI Training Program and the USAARMC concurred with the selection of the new audience members as well as the rationale for their selection. This was an important step in ensuring that the expectations of the proponent agencies and program stakeholders would be met. The expanded training audience is shown in Figure 1.

Designing the Tactical Scenario

The COBRAS II scenario was not developed from scratch, but represented a revision, or more accurately, an expansion of the COBRAS I scenario. In the early stages of scenario redesign, efforts were driven by two distinct purposes:

1. to include events for the new training audience members, and
2. to incorporate improvements based on findings obtained during the COBRAS I trial implementation.

The first purpose (above) required an analysis of how well the existing storyline and series of events would involve the new training audience members, drawing them into the staff process. Scenario events that simply gave them something to do were not sufficient. This analysis depended on a general, comprehensive job and task analysis for each of the five positions, derived from Army documentation and from discussions with SMEs. Further progress was made during the COBRAS I trial, during which developers monitored the implementation while envisioning ways to tie in the performance of the new audience members.

The integration of the S3/CHEMO was judged to require the most extensive changes to the scenario. The major change would be including a threat of opposing force (OPFOR) chemical operations. It seemed likely that, during further development, the unchecked use of threat chemical weapons could alter the scenario timeline and become the dominant focus of the brigade staff's efforts. Throughout the development process, developers watched carefully for unintended effects of introducing chemical events into the scenario.

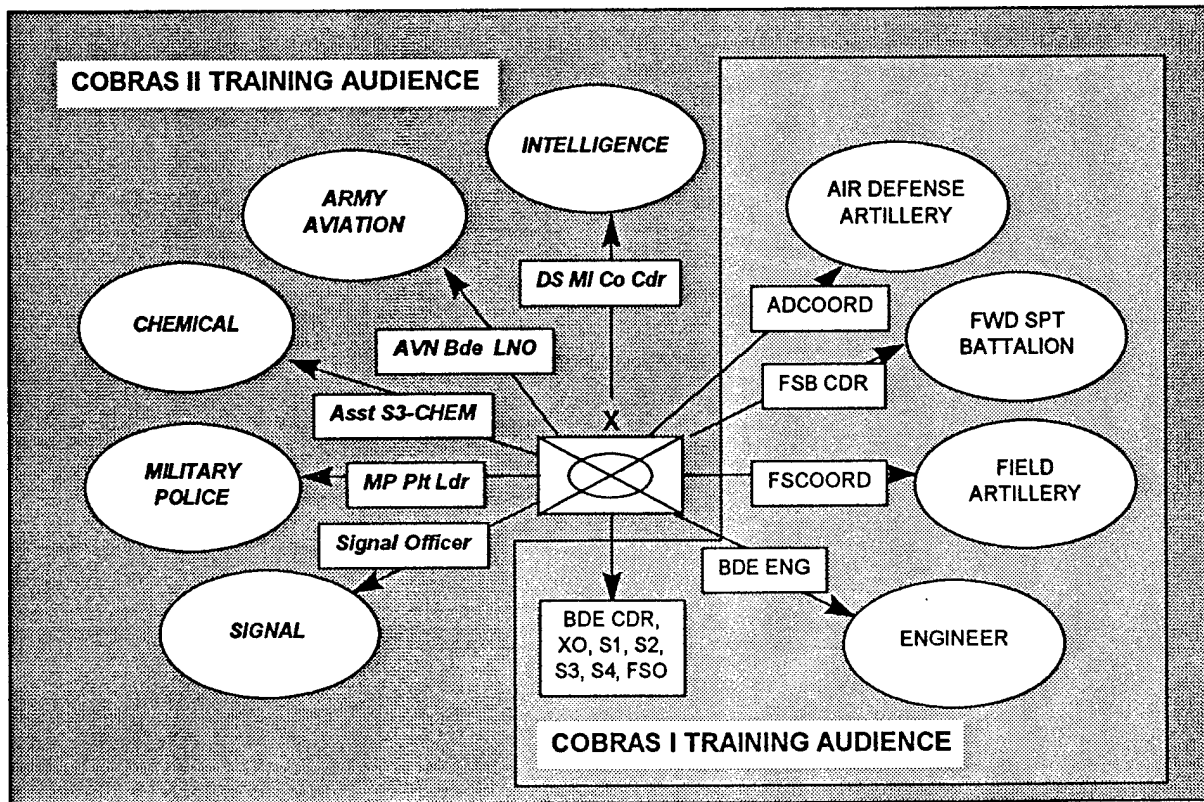


Figure 1. COBRAS I and COBRAS II primary training audience links to brigade assets.

On the other hand, the COBRAS I scenario appeared to offer sufficient opportunities and cues for the activities of the signal officer and the AVN LNO. These two positions were expected to be able to maintain their activities to an adequate extent within the existing maneuver and close air support aspects of the scenario.

Integration of the MP platoon leader would require the addition of tactical activities in the brigade's rear. These activities would keep the MP platoon leader involved in the staff process without altering significantly the overall activity of the brigade. Similarly, activities and cues to ensure integration of the MI company commander could be accomplished without major changes in the scenario. The MI company commander would be provided the typical company-level assets and would interact with the staff in matters of intelligence reports. His/her presence would alter only the brigade's task organization, while leaving intact the remainder of the scenario.

Incorporating these new events and opportunities for performance was the major push in the scenario design effort. Equally important, however, was the need to preserve the structure of the exercise in terms of other design considerations, including the contiguous-mission design, time requirements, and provision of training opportunities for the original training audience members. The contiguous nature was required to cue CS and CSS activities, and the time required for a mission had to be bounded to maintain the exercise's appeal to brigades as something they could accomplish within their limited time and simulation resources.

The second purpose of the scenario design effort, to incorporate the necessary modifications and improvements identified during the COBRAS I trial, was addressed immediately following the trial, and continued well into the scenario design process. Observations and participant feedback about how the scenario could be improved were compiled and discussed in order to identify suggestions that were valid and consistent with the intent for the COBRAS II scenario. The major changes are summarized in Figure 2.

Work to integrate new events and other improvements into the scenario began with the revision of tactical products, starting with the corps and division operations order (OPORD) materials. Other aspects of the scenario, such as products that contained ancillary information (e.g., personnel status, levels of supply and maintenance, intelligence summary information, meteorological and terrain information) that would flow down from division and corps, were also altered to provide performance cues as necessary. Together, these products were the structuring mechanism of the scenario, as they set the situation and conditions under which a brigade would develop its plan.

The initial testing of the scenario occurred in map exercises and staff roleplay enactments. Map exercises were conducted to ensure that the scenario was tactically sound and that the actions required of the brigade were consistent with current doctrine, as well as internally consistent. The scenario was also reviewed to ensure it would not lead the training brigade outside of the context of the contiguous mission concept. The most important focus, however, was on verifying that the scenario would contain the battle events that would cue activity within the brigade staff, including CSS functions.

The roleplay enactments, which were a critical part of the task identification effort (described below), provided opportunities to examine the extent to which the scenario's events would provide performance opportunities for the new training audience personnel. At the same time, attention was also paid to maintaining the performance requirements of the original training audience. Notably, there were few instances in which the revised scenario altered fundamentally the performance requirements of these positions.

Following the initial map exercises and roleplay enactment time frame, and when the tactical products were judged as being sufficiently complete, simulation-based tryouts were conducted, much like those conducted during the COBRAS I project. The tryouts required the development of BBS electronic files which contained the details of the task organization, readiness levels, and operational graphics. Their purpose was to ensure that the scenario would unfold as designed, producing the desired events and cues.

Scenario Revisions Based on COBRAS I Trial

- Reduced the brigade's initial readiness levels in all missions to force more CSS activity.
- Modified OPFOR routes to refine the timing and locations of confrontations with the brigade.
- Moved the brigade's air avenue of approach to make close air support more realistic.
- Extended engineer obstacle zone to influence the outcome of the fight in the area defense mission.
- Modified field artillery Family of Scatterable Mines (FASCAM) authorities to better define conditions of release and deployment.
- Clarified the limit of advance in terms of times, locations, and size of forces.
- Included a tactical combat force in 55 Division to match doctrinal specifications.
- Clarified contact points.
- Provided more information on activities of adjacent units by means of scripted messages from the Exercise Control (EXCON).
- Revised the scripted message to cause intelligence summaries to be sent at regular intervals.

Figure 2. Scenario revisions based on COBRAS I Brigade Staff Exercise trial results.

Mission by mission, the scenario was evaluated for its capacity to logically and realistically contain the events that would cue the intended performance requirements. The resulting scenario and tactical products were judged to be appropriate to support continuing development.

COBRAS II Scenario Storyline

The COBRAS II scenario, with all the changes made during that effort, formed the basis of the COBRAS II BSE. It also provided the framework for how the higher echelon, adjacent and supporting units, subordinate units, and OPFOR were to operate in the vignettes. Although individual vignette scenarios were not direct mission, enemy, terrain, troops, time, and civilian considerations (METT-TC) slices of the larger scenario, the events that provided vignette conditions were drawn from the scenario. Figure 3 contains a brief description of the COBRAS II scenario.

The Road to War

The scenario storyline begins with the brigade in a field training exercise (FTX), having been deployed to the country of Mojave because of an increasing threat from the Krasnovians. The FTX, which creates decrements in personnel and equipment status, ends as intelligence indicates that the Krasnovians are preparing to cross the international border.

Note: The mission sequence presented below is the recommended sequence; however, the BSE will support any of the three missions being run in any sequence.

The Area Defense (AD)

The brigade staff then receives an order for an AD mission, and must simultaneously conduct its consolidation and reorganization activities and plan for the AD using a modified decision-making process. The Krasnovians conduct their attack, which fails after inflicting some losses to the brigade. The brigade then conducts a rearward passage of lines to a rear assembly area (AA) (not performed in the exercise).

The Deliberate Attack (DATK)

Three days later (these three days are not represented in the exercise), the brigade receives a subsequent order to conduct a DATK mission against the remnants of the Krasnovians. The three days in the scenario provide a realistic time for the brigade to return its forces to a level of combat readiness which will make the DATK mission feasible. Again, the brigade staff uses the deliberate decision-making process (DDMP) to develop its plan, briefs the plan, monitors preparation activities, and conducts the attack. The storyline ends with the defeat of the Krasnovians.

The Movement to Contact (MTC)

While the brigade is in its AA conducting medical, repair, and replacement activities, it receives an order to conduct an MTC mission. Using the DDMP, the brigade staff prepares their order, while subordinate units continue their logistics efforts. The MTC is conducted against the Krasnovians' meeting battle.

After the brigade has met and defeated the Advance Guard Main Body (AGMB), circumstances require the brigade and the enemy to stop their advances and take up hasty defenses. The Krasnovian lead elements retreat to hasty defensive positions awaiting the arrival of second echelon forces to conduct an attack.

Figure 3. Summary of COBRAS II scenario storyline.

Designating the Training Objectives

Because of the addition of new training audience members, additional training objectives and tasks were required to augment the COBRAS I lists. Additional analysis was also required to determine how the addition of the new audience and scenario events would affect the tasks for the existing audience (i.e., those 11 designated during the COBRAS I project). Together, these requirements guided the COBRAS II project's task identification process.

During the initial months of the project, the decision was made to identify the tasks for the new training audience members based on the same considerations as were used during the COBRAS I project: The tasks were to be consistent with current doctrine, but could represent performance requirements that were not documented in the Army's doctrinal publications or other task-focused R&D efforts.

The task identification process was modeled on the one used in the COBRAS I project. The original methodology was titled the Staff Performance Analysis (SPA), documented by Ford and Campbell (1997); the variant process for COBRAS II was referred to as the modified staff performance analysis, or Modified SPA (ModSPA). The SPA used roleplay enactments by COBRAS staff with expertise in all aspects of brigade operations as the primary means of identifying staff tasks. Each enactment focused on a single event, as defined by logical break-points in staff activities. Most enactments required the participation of the full brigade staff, or at least that part of the staff represented by the targeted training audience.

The SPA provided opportunities to identify the tasks for all training audience members concurrently. That is, as an event was roleplayed, every brigade staff representative was documenting his or her activities in preparation for further analyses. For the COBRAS II ModSPA, a similar but less time- and labor-intensive method was employed. It involved roleplay enactments of every scenario event (every event had to be examined in order to compile tasks for the entire exercise), but did not require the documentation of activities for the entire brigade staff. The analysis would focus on identifying the performance requirements for the new audience members, but would also serve to identify the activities of other staff who were involved in the relevant aspects of the staff process. The participation of the new audience and the inclusion of scenario events targeting their functions was expected to alter, to some extent, the performance requirements for the original training audience.

As a concluding verification of the task lists, assistance was provided from job and task analysts external to the COBRAS II staff. These analysts had been working on the battlefield functions over most of the previous three years.⁷ Their extensive work in exploring the staff activities at brigade and battalion levels enabled them to provide a review of the technical accuracy of the draft task lists, to offer suggestions on modifications or additions to make the lists more descriptive of staff activities, and to provide a verification of the consistency among lists for various staff members.

Results of the Modified Staff Performance Analysis

The ModSPA yielded task lists for each of the new training audience members and minor revisions to the task lists of the original training audience (described and contained in Deter, Campbell, & Ford, 1998). The newly created task lists portray each staff member's involvement and actions in each mission segment, as well as the actions and events that should cue training participants to perform the required tasks (an example is shown in Figure 4). The task lists are contained in the BSE materials for two purposes: to assist observers in observation and feedback, and to preview performance expectations for the training audience members.

⁷ The battlefield functions work is described in Harrison (1993).

**Brigade Operations and Training Officer Task List
for Mission Analysis–Movement to Contact Mission**

- | | |
|----------|--|
| 1 | Task: Updates operations estimate with current battlefield information.
Cue: Receipt of division warning order (WARNO)
Product: Updated operations estimate |
| 2 | Task: Briefs the current brigade status to include locations of maneuver units and other critical weapons systems, tactical command post (CP), and tactical operations center (TOC).
Cue: On request of the Brigade Executive Officer (XO) or Commander |
| 3 | Task: Reproduces sufficient copies or extracts of division order and distributes to Brigade XO, staff, and other key participants.
Product: Sufficient copies of the division order/extract for the brigade staff to use in decision-making process |
| 4 | Task: Reads and analyzes the Corps Commander's intent in conjunction with the corps mission and scheme of maneuver.
Product: Sketch of the corps scheme of maneuver |
| 5 | Task: Reads and analyzes the Division Commander's intent in conjunction with the division mission and scheme of maneuver.
Product: Sketch of the division scheme of maneuver |
| 6 | Task: Assesses task organization within the division to determine its possible effects on the brigade's mission and tasks. |
| 7 | Task: Reads and analyzes the division order and extracts information related to Army airspace command and control (A2C2) operations such as A2C2 concept, A2C2 control measures, suppression of enemy air defense operations in the division, enemy and friendly air corridors, attack positions and objectives, forward arming and refueling point locations, and identification, friend or foe/selective identification feature lines.
Product: Updated A2C2 estimate |
| 8 | Task: Identifies and assesses assets available to the brigade. |
| 9 | Task: Conducts terrain analysis and trafficability in the brigade sector with the Brigade Intelligence Officer and Brigade Engineer to include: avenues of approach, mobility corridors, key terrain, and obstacles.
Product: Initial terrain analysis |

Figure 4. Sample of individual task list resulting from the modified staff performance analysis activities.

Although these tasks contained information concerning staff interactions, they were not directly usable in providing feedback on staff processes in the form of after action review (AAR) sessions. The AARs are generally group sessions involving all members of the primary training audience, in which the observers facilitate discussions of what happened, what should have happened, and what staff behaviors should be sustained or improved (DA, 1991). To construct the AAR framework, the tasks were aggregated into staff process descriptions, which were then prepared in the form of AAR outlines for use by the observers. A sample is shown in Figure 5.

Mission Analysis	
<ul style="list-style-type: none"> • Prepare initial intelligence preparation of the battlefield • Analyze higher mission • Analyze division order 	<ul style="list-style-type: none"> • Assess risk • Briefing and approval
Course of Action (COA) Development	
<ul style="list-style-type: none"> • Analyze commander's guidance • Analyze relative combat power • Generate conceptual possibilities 	<ul style="list-style-type: none"> • Develop scheme of maneuver • Incorporate all BOS
Wargaming	
<ul style="list-style-type: none"> • Follow a wargame method • Employ all friendly forces/resources • Identify critical events and decision points 	<ul style="list-style-type: none"> • Record results • Apply action/reaction/counteraction • Assess results
COA Comparison	
<ul style="list-style-type: none"> • Select comparison method • Determine decision criteria 	<ul style="list-style-type: none"> • Assign weighting values to criteria • Record results (COA decision matrix)
Orders Preparation	
<ul style="list-style-type: none"> • Incorporate commander's guidance • Identify who, what, where, when, and why 	<ul style="list-style-type: none"> • Incorporate BOS plans • Review and approve
Rehearsal	
<ul style="list-style-type: none"> • Define the standard • Orient participants to terrain • Verbalize concept of operation 	<ul style="list-style-type: none"> • Select key events to rehearse • Describe enemy COAs • Focus on three major purposes of rehearsals
Modified Decision-Making Process	
<ul style="list-style-type: none"> • Mission analysis • Essential information • Commander's concept 	<ul style="list-style-type: none"> • Wargame • Orders preparation • Rehearsal
Mission Execution	
<ul style="list-style-type: none"> • Acquire information • Analyze and interpret information • Update estimates 	<ul style="list-style-type: none"> • Disseminate information • Make recommendations and decisions • Supervise

Figure 5. Staff process description formed from the individual task lists.

Because of the low-resource nature of vignettes, with no significant observer staff to assist in performance, the individual task lists were not directly incorporated in the vignettes. Rather, as with the AAR materials, descriptions of staff process pertinent to the vignette event were created. These descriptive statements served as the training objectives, and discussion probes were also developed to present more detailed behavioral descriptions.

The ModSPA also facilitated generation of sample tactical products that would be used as training aids in association with the BSE. Sample products were to be used by the observers to

show the training audience “a-way” examples of the tactical products that should result from the staff process.

Designing the Exercise Architecture

Every aspect of the original (COBRAS I) BSE was precisely designed to support the intent of the exercise, which was driven by the specific training audience and the scenario. Participants had well defined and purposeful roles, simulation layout and usage were described in specific terms, the scenario was highly structured, and the TSP was thorough and direct. Because the exercise was not intended to train all aspects of brigade functioning, the model specified 8-10 hour workdays and operations out of administrative CP locations in or near the simulation center. Thus, all components of the design and the TSP itself were created to represent a tightly linked group of products that, when put together, would support the functioning of all participants.

In the COBRAS II effort, even though the same basic exercise model was to be employed, the training audience was expanded, leading to a sequence of changes throughout the exercise's architecture. Additionally, lessons learned during the development of the original BSE had to be incorporated. The changes to the BSE structure fall into three areas:

- participant types and numbers,
- roleplayer and interactor training, and
- performance observation and feedback.

Participant Types and Numbers

The number of participants changed not only by the addition of the new training audience members, but also because of the need for supporting personnel for those functions (i.e., observers, roleplayers, and interactors). Overall, the increase was from 113 to 132 participants.

Concerning observers, the COBRAS I BSE had recommended a staffing plan that combined some of the training audience members functionally under observers. The revised BSE, however, specified one observer for each training audience member; a one-for-one staffing arrangement. As a compromise to support circumstances where obtaining 16 observers might be unfeasible, the new BSE also offered a less intensive staffing plan similar to the plan proposed in the original BSE. This minimal staffing plan called for ten observers. New observer positions included a Chemical Observer, a Signal Observer, a Personnel and MP Observer, an Army Aviation Observer, an Engineer Observer, and an air defense artillery (ADA) Observer. The last two of these split the duties of what, in the COBRAS I BSE, had been the CS Observer.

Four roleplayers were added to provide information and task cues to the new target audience. Additionally, five interactors were added to staff the simulation workstations. Figure 6 presents the COBRAS II BSE exercise layout.

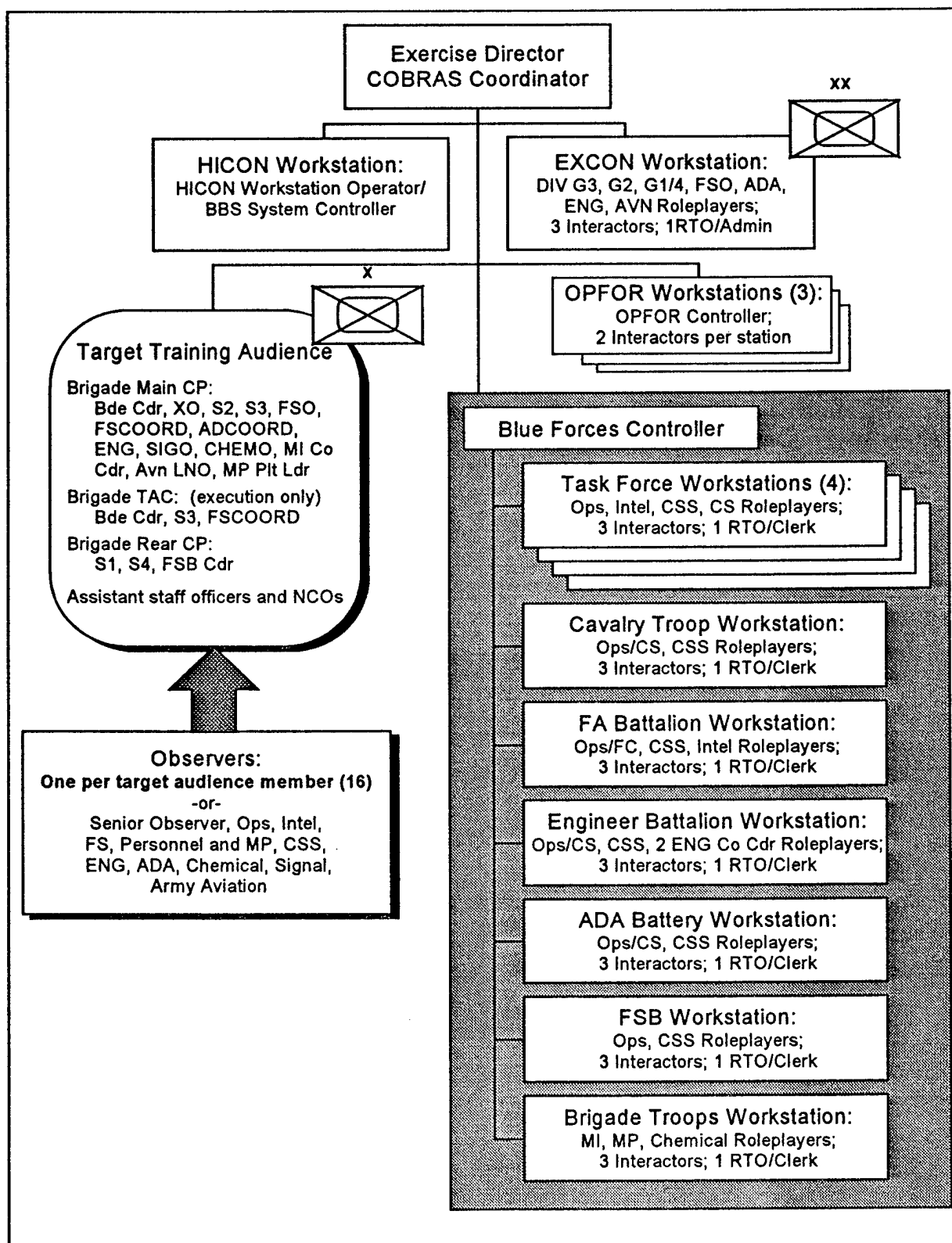


Figure 6. Participant locations during conduct of a COBRAS II Brigade Staff Exercise.

Roleplayer and Interactor Simulation Training

In order to facilitate BBS training for interactors and roleplayers, the COBRAS I BSE provided a brief training outline and slides. However, during the COBRAS I pilot and trial implementation, the training for interactors and roleplayers was not sufficiently detailed on the specific functions to be performed during the COBRAS program (Graves et al., 1997).

In the development of the COBRAS II BSE, the developers chose to provide more specific guidance regarding the BBS training needs that were required by the BSE. The COBRAS BBS roleplayer/interactor training plan was designed and written to supplement the interactor training that a site typically provides. The program focuses on helping the interactors and roleplayers to implement the COBRAS scenario in BBS, an activity that is key to allowing the brigade staff to achieve their training objectives.

The roleplayer/interactor training is a three-phase program, including BBS train-up for interactors, practical exercises in which interactors practice the tasks that are important during BSE execution, and a mini-exercise in which interactors and roleplayers can learn how to work together to accomplish their objectives and portray the scenario. The role of the site staff is to help interactors learn how to operate BBS and to help roleplayers learn how to work with interactors.

The roleplayer/interactor training is executed according to the guidance provided in the *BBS Site Manager's Guide*, and uses two other information sources as well: the *BBS 5.0 Warfighter's Guide* (National Simulation Center; BBS General Support Team; Logicon Technical Services, Inc., and U.S. Army Communication Electronics Command, 1994) and the COBRAS interactor guides. The program, described below, was thoroughly documented in the *COBRAS BBS Site Manager's Guide*, a component of the BSE TSP that was added for COBRAS II.

The overall goal of the roleplayer/interactor training is to establish a good working relationship between roleplayers and interactors; roleplayers should know how to utilize the interactors. Specific objectives for each phase of the training are described in the *COBRAS BBS Site Manager's Guide* as:

- Phase 1 – "...interactors should be familiar with the scope and specifics of the tasks they are to perform. They should also be able to execute the most common and important tasks on the simulation."
- Phase 2 – "...interactors should have improved their ability to perform BBS tasks well enough to conduct a mini-exercise with roleplayers."
- Phase 3 – "...the interactors should be able to hone their BBS skills and the roleplayers should become generally familiar with BBS."

By the end of the mini-exercise, all of the interactors and roleplayers should have some familiarity with how to execute the mission in BBS, as well as a common understanding of the differences between BBS and tactical terminology. Additionally, roleplayers must understand which operations and combat functions can and cannot be performed in BBS and which operations have to be performed by magic at the higher control workstation.

Performance Observation and Feedback

Significant modifications were made to the BSE design in the area of performance observation and the provision of feedback. The role of the observers in the COBRAS II BSE was essentially the same as in COBRAS I: to serve as mentors, coaches, and providers of feedback both in informal discussions and in more formal AARs with the brigade staff. In COBRAS I, frequent AARs (at least daily) were used instead of the more common model of an AAR only at mission completion. This approach was followed again in COBRAS II. However, as a result of observations during the Fort Riley COBRAS I trial implementation, certain modifications were made in the observer TSP materials.

One of these changes concerned AAR preparation. During the trial implementation, observers remarked that there was not enough time in the schedule to prepare for the AARs, and requested a two hour pause in the exercise (one hour to prepare, one hour for the AAR itself). At the same time, training audience members stated that one hour of "pause time" in the exercise for AARs was as much as they were willing to give up. As a compromise, the instructions to observers were modified to suggest that they take an hour for AAR preparation while the brigade staff continued to work on the next phase of the exercise; the AAR itself would still require only one hour of pause.

Another change was made to the AAR materials themselves. More slides were added to the package to provide the observers with additional visual presentations of the critical materials. Most of the added slides were expected to serve as back-up material, in case the brigade commander wanted additional discussion on specific points. As with COBRAS I, the slides were presented both on paper and in a Microsoft® PowerPoint® format. The electronic version was provided to enable observers to customize the slide content and order for their own use.

The AAR focus for each mission segment was also revised in order to clarify the intent. Each AAR was focused on helping the brigade commander and his staff determine if the outputs of that segment would provide all that was needed—the inputs—for the next segment. These outputs could be products, guidance, decisions, staff input, information, or analysis and sharing of information. The AARs were designed to help guide the staff to:

- look at what they just accomplished and the processes they used,
- compare it to what they intended to accomplish and the processes they intended to use,
- determine if they needed to make changes to their processes, and
- describe how they intended to accommodate those changes in future operations.

The third area of change concerned the provision of the sample brigade products. These were to be used to show or demonstrate selected outcomes of staff activities. A selected set of products was reviewed during the trial implementation with the observers, and their reactions were uniformly positive. These products were developed during the ModSPA described above. They were intended to serve as models of *type of content* only, as the specific contents would depend on the particular decisions worked out by the brigade staff during their planning.

Finally, there was a more explicit emphasis on involving the commander in designing the specific observation plan. The Senior Observer was instructed to meet with the brigade

commander to clarify his (the commander's) expectations, paying particular attention to his stated training objectives and focus so that the observer team could be attuned to that emphasis. The Senior Observer was to review the unit tactical standing operating procedures (TACSOP) and resolve any differences between it and the COBRAS task lists and AAR materials by means of discussions with the commander. Additionally, all of the observers were expected to become familiar with the TACSOP before the exercise began.

Developing the Training Support Package

As the changes in the participants and other aspects of the BSE's design were incorporated, the BSE TSP changed accordingly. Because the trial implementation would involve only one mission, development focused on design for that mission only. The major changes that were made in preparation for the trial implementation were as follows:

- The tactical materials were revised as described above, providing the modified division OPORDs, intelligence reports, and message traffic for the added scenario events. Several additional overlays were also provided because of the aviation events now being included.
- The training audience preparation materials for the new TSP contained a more complete description of the AAR process.
- Observer materials also contained the fuller AAR description, as well as guidance on the use of the sample products. A completely new set of AAR materials was provided, with more slides (especially back-up slides) and textual guidance for the slides. The sample products were included in a separate package.
- The interactor guides were restructured to provide separate materials for each type of BBS workstation terminal (i.e., combat, CS, and CSS), because the activities at the terminals vary so widely.
- Additional roleplayer guides were prepared to cover the separation of the ADA and engineer functions as well as the addition of the brigade troops workstation.
- The OPFOR Controller was given somewhat more latitude in choosing schemes of maneuver, always under the oversight of the Exercise Director.
- Instructions on conduct of the exercise in the *Exercise Guide* were modified to track with the changed scenario. Instructions on TSP distribution were modified in accordance with revisions to the TSP and were also expanded in order to make them easier to use.
- The *BBS Table of Organization and Equipment (TOE)* and *Initialization Book* and the *BBS Archive Book*, which contain documentation on the BBS database specifications, were revised to enhance clarity and completeness.
- Three new guides were added to the TSP for the COBRAS II BSE:
 - The *Brigade Orientation Guide* provides the brigade commander with a complete description of the exercise and its resource requirements. It is designed to help the

commander decide whether or not he should implement the COBRAS II BSE, and what he needs to do to get started.

- o The *XO Guide* contains instructions for the brigade XO on staff preparation for the exercise, and also describes how CSS reports have been distributed to the training audience members in their preparation materials. This last information allows the XO to know what information about starting conditions has been provided to various elements of the training audience.
- o The *Simulation Site Manager's Guide* includes descriptions of the BBS tapes and other documentation. The intent was to inform the simulation site staff about the rationale for the structure and contents of the database, so that they would not feel compelled to revise the database, and so that any revisions requested by the brigade commander could be made without damaging the integrity of the exercise.

Figure 7 provides a description of the overall COBRAS II BSE TSP structure, as it existed going into the trial implementation.

Summary

Even with the COBRAS I experience and materials, development of the COBRAS II BSE and vignettes was a complex process. The initial development described here resulted in preparation of the BSE and vignette exercises and TSPs ready for trial implementation. The next section (Section 4) describes the BSE trial implementation and evaluation plan, the findings, and the results of that trial, including the revisions made to the exercise and TSP. For vignettes, the evaluation processes will be described in Section 5.

TSP Category	TSP Item
Exercise Management	<ul style="list-style-type: none"> • Exercise Guide for the Exercise Director, COBRAS Coordinator, and Blue Forces Controller, with Appendixes • Brigade Orientation Guide
Tactical Materials	<ul style="list-style-type: none"> • Corps Concept (Movement to Contact, Area Defense, and Deliberate Attack) • Division Orders and Tactical Materials (including overlays) • Scripted and hard-copy messages
Participant Guides and Materials	<p>Training Audience:</p> <ul style="list-style-type: none"> • Training Audience Guide (generic, for all 16 training audience members) • XO Guide to Unit Preparation and Materials Distribution • Initial Situation Packages and start of exercise (STARTEX) Position Overlays (per staff member, per mission) • Task Lists (per staff member, per mission) <p>Observers:</p> <ul style="list-style-type: none"> • Observer Guide (generic, for all Observers) • Task Lists (per Observer, per mission) • Observer After Action Review Briefing Materials <p>Roleplayer Teams:</p> <ul style="list-style-type: none"> • EXCON Roleplayer Guide • TF 1-5 Roleplayer Guide • TF 1-7 Roleplayer Guide • TF 3-5 Roleplayer Guide • TF 1-80 Roleplayer Guide • ADA Roleplayer Guide • Opposing Force Controller Guide • Cavalry Troop Roleplayer Guide • Field Artillery Roleplayer Guide • Engineer Roleplayer Guide • FSB Roleplayer Guide • Brigade Troops Roleplayer Guide • Initial Situation Packages and STARTEX Position Overlays (per roleplayer team, per mission) <p>BBS Interactors:</p> <ul style="list-style-type: none"> • EXCON Interactor Guides (versions for CS, and CSS Interactors at EXCON workstation) • Blue Interactor Guides (versions for Combat, CS, and CSS Interactors at Blue workstations) • Red Interactor Guides (versions, for Combat and CS Interactors at Red workstations)
Simulation Materials	<p>Tools for initializing BBS and making changes or corrections:</p> <ul style="list-style-type: none"> • Simulation Site Manager's Guide • BBS TOE and Initialization Book • BBS Archive Book • BBS System Tapes

Figure 7. Structure of the COBRAS II Brigade Staff Exercise training support package at the time of the trial implementation.

SECTION 4: TRIAL IMPLEMENTATION OF THE BRIGADE STAFF EXERCISE

The key evaluation event during the development of the COBRAS II BSE was the trial implementation conducted at Fort Lewis, WA, with 3rd Brigade, 2nd ID. This trial involved use of the TSP for one mission with participation of personnel representative of the target training audience.

This section describes that trial, and indicates the evaluation methodology employed and the trial results. Three topics are discussed:

- *Trial Implementation*: Describes the specifics of the formative evaluation in terms of the purpose of the trial, the evaluation methods and restrictions/constraints, and the evaluation staffing plan.
- *Trial Implementation Results*: The trial results represent analysis of feedback provided by participating unit members and observations made by COBRAS developers. The findings provide a comprehensive summary portrayal of the data collected.
- *Program Revisions*: Describes the extent of revisions that were made to the TSP as a result of the trial.

Trial Implementation

The purpose of the trial implementation was to permit evaluation of the effect of training program design decisions, the utility of the TSP components, and perceptions of training benefits. Exercise developers observed the planning, preparation, and conduct of the exercise and performed various data collection activities. Although developers were prepared to assist in implementation as necessary, in order to ensure that the exercise could be conducted, the intent was to operate in a "hands-off" mode as much as possible.

Certain features of the actual implementation limited the ability to generalize the findings beyond the single implementation. In general, the exercise was implemented according to the guidance provided in the TSP. There were several departures, however, as described below.

- Because only one mission (the DATK) was exercised, CSS activities were not fully performed. These activities generally take place between missions, when the brigade is recovering from one operation and preparing for the next.
- The unit employed three task force (TF) units and no cavalry troop during the exercise, rather than the four TFs and one cavalry troop called for in the scenario. While this organization matched the brigade's actual structure, the change required modification of the division OPORD, brigade sector, and associated tactical materials. Thus evaluation of the exact METT-TC elements, as designed, was incomplete. However, the trial implementation still produced many valuable insights concerning tactics, unit desires, and the complexity of correctly generating all of the cues needed for unit performance.

- The observers had little brigade level experience, although they did have extensive observer experience at the battalion level.
- The model called for a senior officer, preferably from the brigade's higher headquarters, to serve as the Exercise Director. However, because no one of that level was available to fill the role, those duties and responsibilities were shared by the brigade commander, the Senior Observer, and the officer in charge (OIC) of the simulation center, with some assistance from the COBRAS team members on site.
- Pre-exercise training conducted by the simulation site staff did not follow the roleplayer/interactor training plan contained in the TSP. Rather, the staff used their own familiarization approach. This change was estimated to have had little negative effect on acquisition of BBS skills, but did it not provide the additional COBRAS information and emphasis. Observations of the training were used to modify the COBRAS training description to bring it more in line with what was actually done and with what should be anticipated at other BBS sites.

COBRAS staff involvement in the implementation was extensive. Two pre-implementation trips were conducted to coordinate the staffing for the exercise, work with the simulation site staff on modifying the BBS files, and assist in modifications to the tactical materials. Innumerable telephone conversations occurred to ensure that the TSP materials were being correctly assembled and distributed. In every case where COBRAS staff assisted in preparations, detailed notes were recorded about the nature of the request for assistance, so that the TSP could be examined and revised as necessary.

For the conduct of the trial implementation itself, 12 of the COBRAS staff were on site before the interactor and roleplayer training began, two days prior to the exercise start. Again any requests for assistance were noted for later incorporation into the materials.

Trial implementation data were collected by means of four general methods:

- Structured interviews were conducted with key participants, including all three members of the exercise administrators (the simulation center OIC, COBRAS Coordinator, and Blue Forces Controller), all observers and training audience members, the individual representing the Division Operations Officer (G3) at EXCON, and the OPFOR Controller. The interview protocols had been prepared before the trial began, in order to ensure that careful attention was paid to critical evaluation issues.
- COBRAS developers observed every phase of the implementation process, from initial unit decisions and preparation and distribution of the TSP materials through conduct of the exercise itself.
- Questionnaires were prepared and distributed to all of the participants, including even the brigade assistant staff members and staff sections, all roleplayers, and all interactors. The questionnaires contained a mixture of two types of items: 5-point scale response items (e.g., disagree-agree) and open ended items (e.g., what additional initialization instructions were needed?).

- Group discussions at the conclusion of the exercise were used to obtain more in-depth information and perceptions of the training quality and value, and ideas about exercise features that should be strengthened, modified, or dropped.

Trial Implementation Results

The results from the participant interviews and questionnaires at the trial implementation of the COBRAS II BSE are described below. The presentation is organized into three topics: exercise design, TSP, and training benefit.

Exercise Design Findings

The aspects of the exercise design that were evaluated during the trial implementation included the following:

- resource requirements,
- the scenario,
- brigade staff task lists and sample products,
- adequacy of staffing and experience specifications,
- pre-exercise BBS training for interactors and roleplayers,
- observation and feedback procedures,
- exportability, and
- implementation conditions.

Resource requirements. Resource requirements are a long-standing concern in simulation-based exercises. Given the resources that brigades are able to commit to training, the exercise was designed to use personnel efficiently, and the TSP was organized to limit reading and study prerequisites to the absolute minimum. Of particular interest was the extent to which the BSE TSP would reduce the effort a brigade and the simulation center staff would expect to expend in designing, planning, preparing for, and conducting such an exercise. Results concerning resource requirements included:

- The simulation center OIC and COBRAS Coordinator were asked about the extent to which the scenario and the implementation instructions reduced preparation time. Their responses to both questions were positive, indicating that the scenario and TSP were valuable in reducing the total time spent in preparation for the exercise. This finding reinforces the assumption that the structured training concept is valuable for time-strapped organizations.
- Roleplayers and interactors were asked to evaluate the time and effort expenditures for the BSE, contrasting those expenditures with those required for other types of training. As shown in Figure 8 both roleplayers and interactors characterized their responsibilities in the BSE as being relatively less intensive, in terms of the time and effort required, than typical BBS exercises.

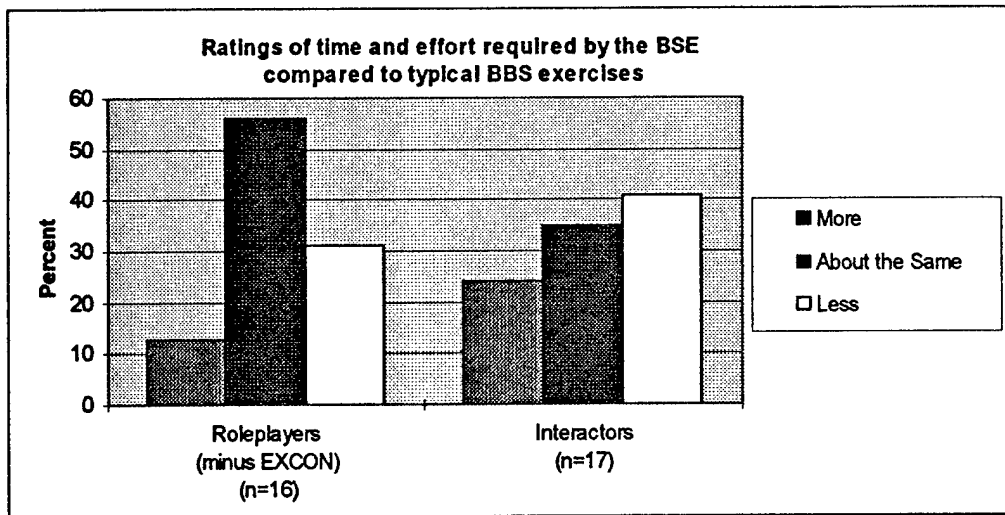


Figure 8. Feedback on time and effort requirements for roleplayers and interactors.

- The training audience members (n=16) reported that the BSE required less of an investment by the brigade than do typical BBS exercises, leader training programs, and NTC rotations. Figure 9 presents the ratings provided for each program type.

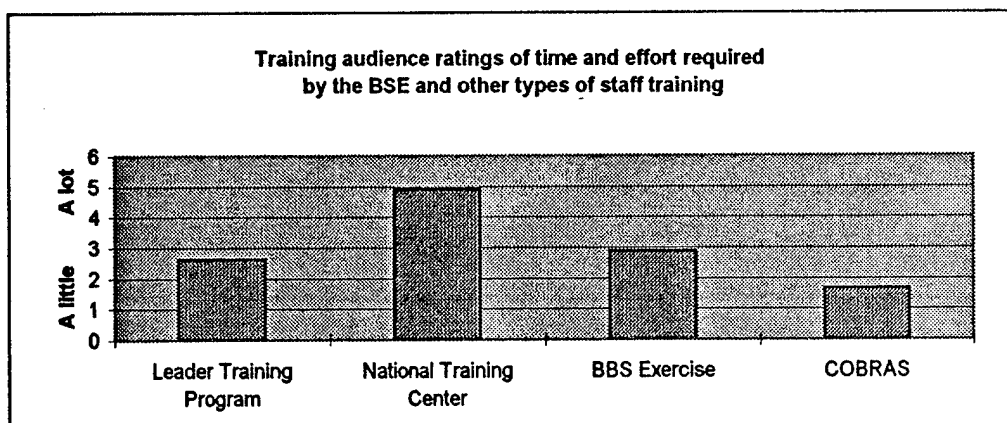


Figure 9. Feedback on the time and effort requirements for training audience members.

- The three exercise management participants were asked how the exercise compared to other exercises in terms of personnel requirements. There was no consensus among them. The simulation center OIC indicated that the BSE required more personnel than other exercises, while the COBRAS Coordinator believed the BSE required fewer persons. The Blue Forces Controller reported that there was no difference.

In sum, trial feedback indicated that the BSE was acceptable, although not ideal, in terms of the time and personnel resources it requires. However, no major changes that could have significantly reduced the requirements while preserving the instructional content necessary to support the training structure were indicated.

Scenario. The scenario was another topic for evaluation. The COBRAS II scenario, a modification of the original COBRAS I scenario, underwent numerous modifications during the

course of the project. Map exercises, OPORD reviews, and internal pilots all greatly facilitated the iterative process of designing, testing, and revising the scenario. The trial represented the final test of the scenario to verify the internally-tested design modifications. Feedback was collected from participants on various aspects of the scenario.

- The training audience, simulation center OIC, and COBRAS Coordinator were asked about the extent to which the scenario presented a sufficiently challenging tactical problem to drive planning and preparation. Feedback indicated that the tactical problem was moderately to highly challenging for the training audience respondents (n=16) (see Figure 10). The simulation center OIC and COBRAS Coordinator also responded that the tactical problem challenged the brigade staff members.

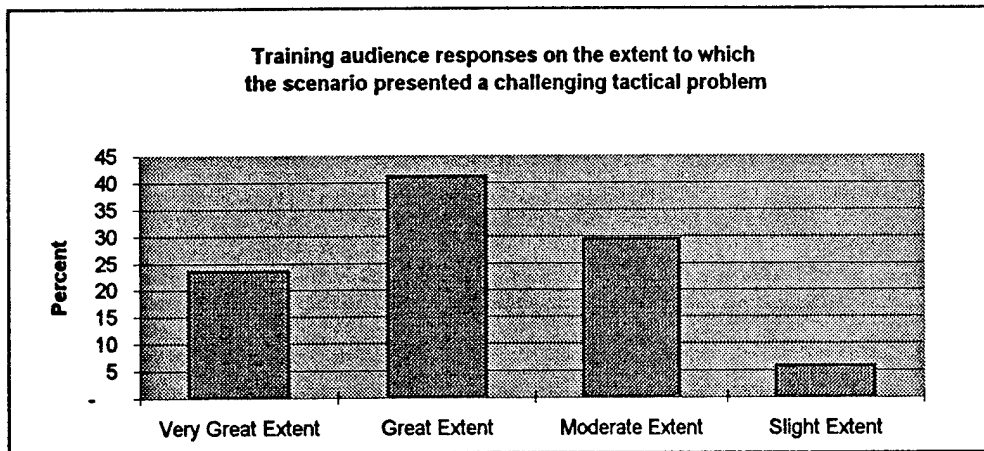


Figure 10. Feedback on the difficulty of the tactical problem.

- The same participants were also asked about the extent to which the scenario conditions supported a challenging exercise. This item differs from the previous one in its focus on the conditions during execution, as caused by the OPFOR, division directives, CSS conditions, and so on. The results from the training audience (Figure 11) were positive, as were results from the simulation center OIC and COBRAS Coordinator, indicating that the exercise was appropriately challenging but not overwhelming.

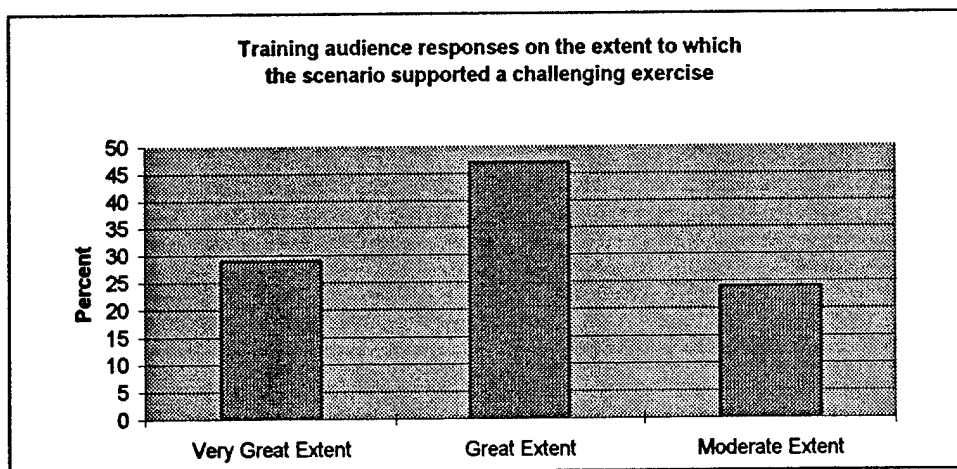


Figure 11. Feedback on the difficulty of the exercise caused by scenario conditions.

- Another aspect for scenario evaluation concerned the completeness of CSS activity in the BSE, compared to other BBS exercises. Results from those who were questioned, including the training audience (n=15), simulation center OIC, COBRAS Coordinator, and Blue Forces Controller, indicated a dramatic difference in favor of the BSE. This provided support for achievement of one of the program objectives, to provide CSS practice for the brigade staff. Results for the training audience are shown in Figure 12.

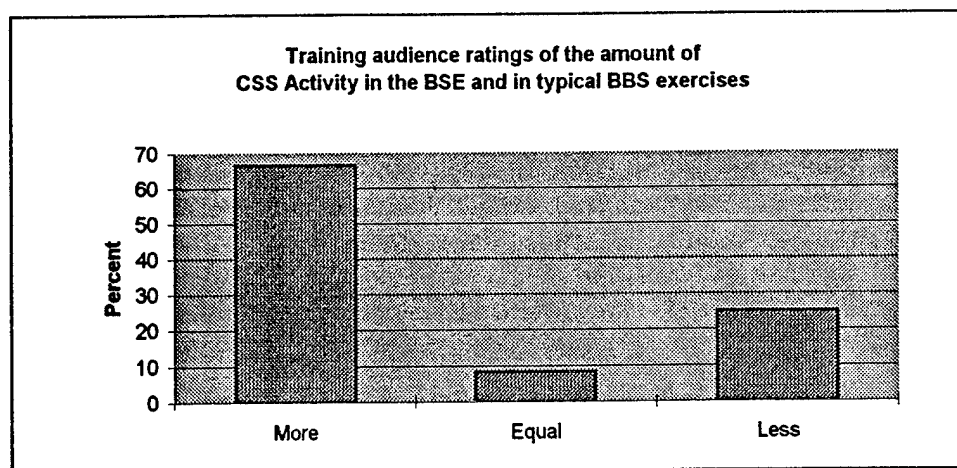


Figure 12. Feedback on the amount of combat service support activity in the Brigade Staff Exercise.

- The EXCON roleplayers (n=6) and OPFOR controller, who were most responsible for driving the scenario and providing the performance cues, were asked about the extent to which the scenario cued opportunities for the training audience to practice the training objectives. The results were clearly positive, with six respondents reporting that the scenario provided the required cues to a great extent, and one reporting a moderate extent of agreement that the cues are appropriate for the training objectives.

- The OPFOR Controller was asked whether or not the OPFOR's specified courses of action were too restrictive. His response was ambivalent, indicating that he neither agreed nor disagreed that the scenario was too restrictive.

Brigade staff task lists and sample products. The BSE provides exercise specific task lists, as well as sample products, for the brigade staff and observers. A close examination of the utility of these products, therefore, was a key component of the evaluation. Questionnaire items and interviews with observers and training audience members were designed to address utility issues. Five items concerning the task lists and sample products were posed to the observers. The results on the five items were generally positive, indicating that both the task lists and the sample products were useful to observers for their intended purposes. The items are shown below, with results portrayed in Figure 13 and Figure 14.

- To what extent did reviewing the task lists help you prepare for the BSE?
- To what extent were the task lists useful in keeping track of what to observe?
- To what extent were the task lists useful in coaching the brigade staff?
- To what extent did studying the sample products help you prepare for the BSE?
- To what extent were the sample products useful in coaching the brigade staff?

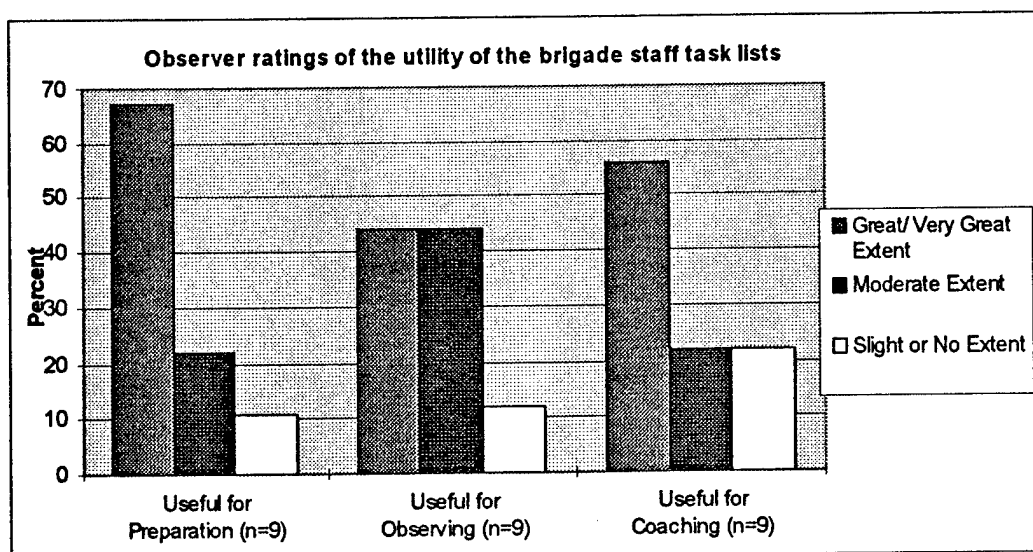


Figure 13. Feedback from observers on the value of the brigade staff task lists.

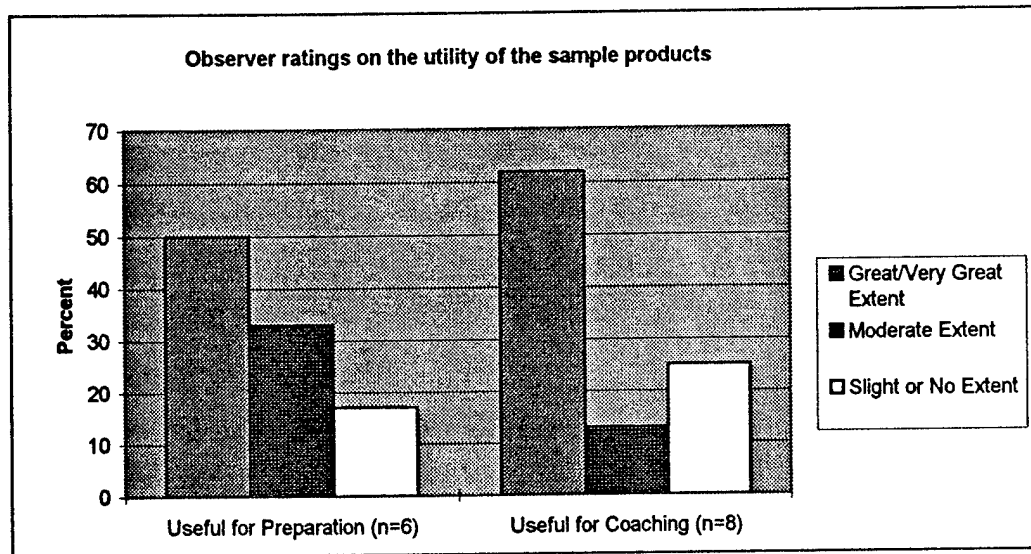


Figure 14. Feedback from observers on the utility of the sample products.

Three questionnaire items that focused on the task lists and sample products were addressed to members of the training audience. Again, the results were consistently positive. The items are shown below, with results shown in Figure 15.

- To what extent did the task lists clarify what you would be doing during the BSE?
- To what extent did the task lists match the demands of your job during the BSE?
- To what extent were the task lists useful in helping you prepare for the exercise?

Comments provided by the observers and training audience were also helpful in explaining how the task lists and products could be used in the BSE context. These comments included the following:

- "The task lists served as a memory jogger/reminder as I prepared [to perform] each event."
- "Task list is a good tool to review after and before a task is completed."
- "The task lists are very good for someone who hasn't had much experience [as an observer]. It helps to re-trigger their minds on where to focus when observing the brigade staff."
- "Task lists are the most important part for [observer] preparation and coaching."
- "Look at the task lists in preparation for each segment."
- "Although they use [a different format], the training audience found it useful to see another product."
- "Sample products are good for format and how it meshes with the order."
- "Wish [observers] had the products earlier, to use in preparation."

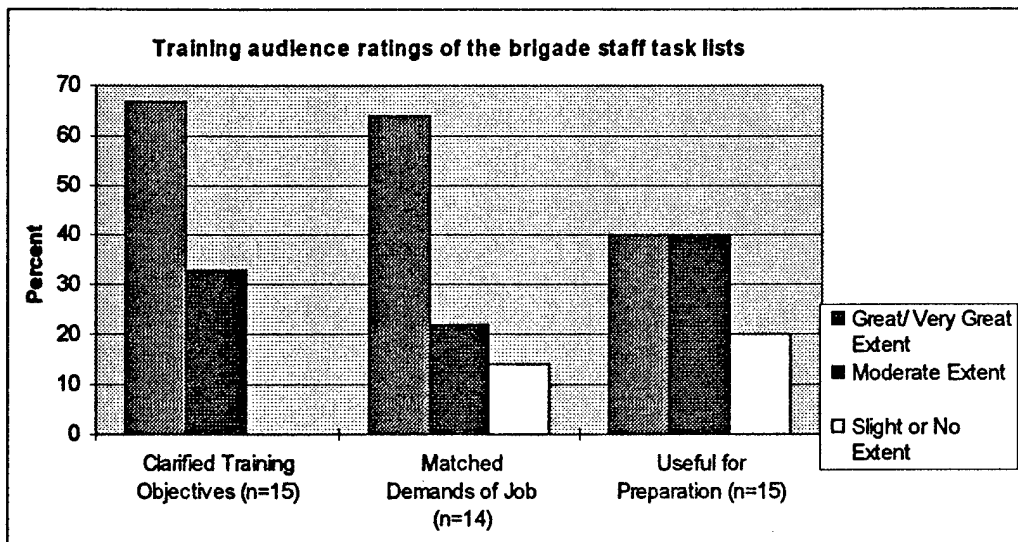


Figure 15. Feedback from the training audience on the brigade staff task lists.

Adequacy of staffing and experience specifications. Because of the importance of limiting the number of support personnel, one focus of the evaluation lay in scrutinizing the extent to which certain participant groups were adequately staffed.

- Figure 16 presents the results of a questionnaire item on staffing adequacy for EXCON and blue forces roleplayers and observers. In general, there seemed to be no strong indication that staffing levels required any changes.

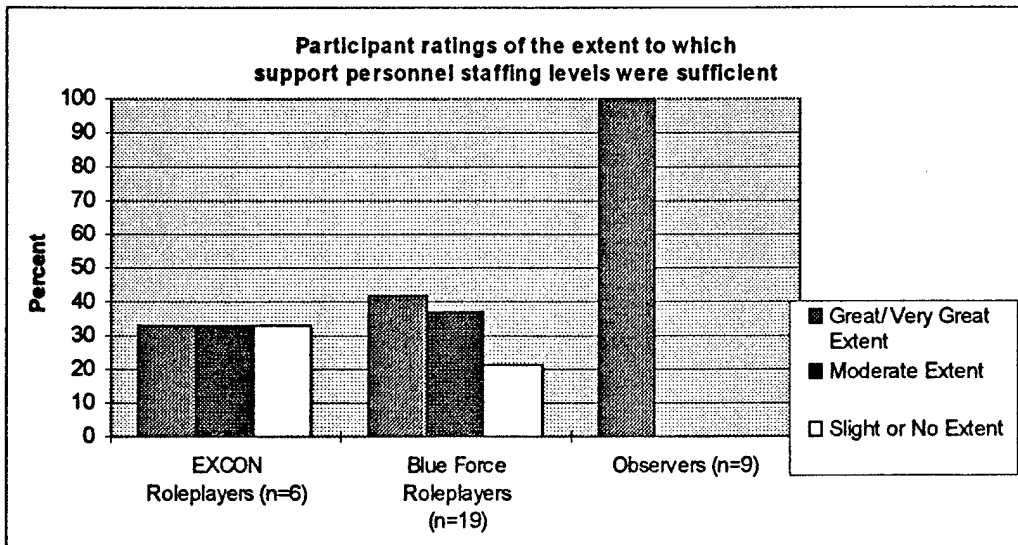


Figure 16. Feedback on the adequacy of support personnel staffing.

- Another question was addressed to the simulation center OIC, COBRAS Coordinator, and Blue Forces Controller, asking about the need for the positions of Exercise Director, COBRAS Coordinator, and Blue Forces Controller. Both the simulation center OIC and the COBRAS Coordinator responded that the roles were essential. The Blue Forces Controller, however, reported that his position was not necessary,

commenting that he never knew what exactly he was supposed to do during the exercise. This may reflect the continuous presence and involvement of the simulation site staff, who monitored the blue forces workstations themselves.

Had the trial been implemented in strict accordance with the program design, the experience levels of every participant would have closely resembled the levels recommended in the TSP. Given that this was not the case, it was judged as being more beneficial to ask participants if their own experience levels were appropriate for the roles they filled, rather than asking participants whether or not the intended levels would have been correct. The results are shown in Figure 17.

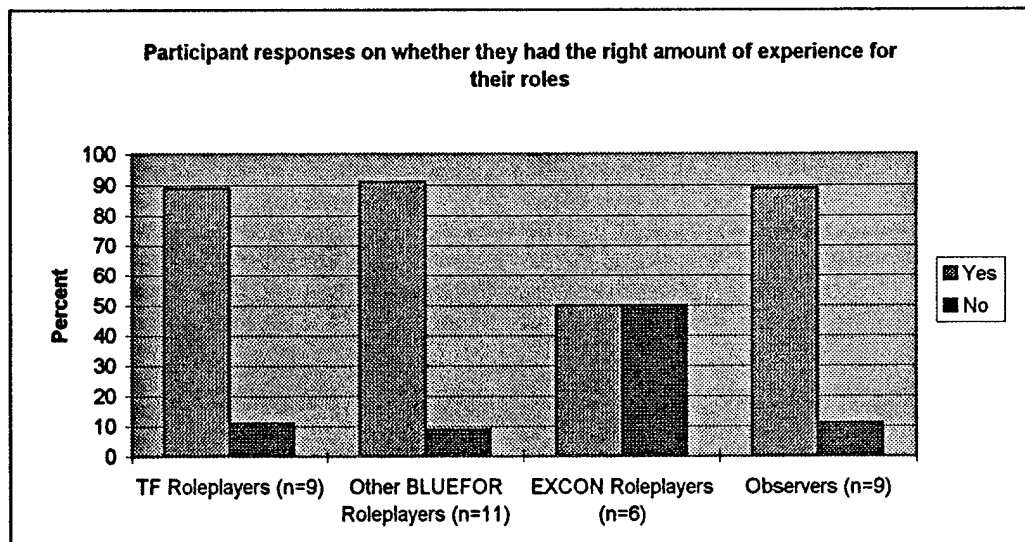


Figure 17. Feedback on the experience levels required for Brigade Staff Exercise participants.

It is interesting that the participants' recommendations concerning experience levels were highly consistent with the recommendations included in the TSP. Some of the comments included:

- For TF roleplayers – experience in the positions roleplayed; experience in tactical planning and orders writing; completed the Armor Officer Advanced Course.
- For other subordinate unit roleplayers – present or former staff officer; at least 12 months experience in a direct support platoon in support of a brigade.
- For EXCON roleplayers – for G3, someone who has worked on a division staff; for division aviation operations, attack aviation experience; for Division Support Command, experience with brigade level OPORDs and logistics; for division intelligence officer, battalion or brigade intelligence officer experience; for division engineer, minimum combat training center (CTC) experience as assistant brigade engineer; for division fire support, division level experience.
- For observers – must have been in the job or branch qualified in a division job.

Pre-exercise BBS training for interactors and roleplayers. The pre-exercise simulation training for interactors and roleplayers was also of interest during the trial implementation.

Developers had outlined a three-phase training plan to be conducted by the simulation site staff, covering BBS fundamentals, interactor practice, and a mini-exercise/BSE rehearsal for interactors and roleplayers. However, the site chose to conduct their own train-up. Therefore, developers sought information regarding how the BBS training could be made most adaptable to the site staff, while still achieving the COBRAS goals, as listed in Section 4.

The findings indicated that roleplayers, interactors, and site staff all felt that BBS familiarization and a roleplayer/interactor practice session were both necessary and sufficient. However, it was also observed that the training provided by the simulation site staff was, in this instance, exceptionally well organized and implemented. Therefore, the more extensive BBS training plan was retained in the TSP in the hope that sites with less well defined procedures would use it.

Observation and feedback procedures. The area of greatest concern on the observation and feedback system dealt with the frequency of AARs and their perceived benefit. Observers were asked to evaluate the AAR structure. Responding to questionnaire items addressing the utility of frequent AARs and the extent to which the exercise schedule supported sufficient AAR preparation time, the observers (n=9) were supportive of the plan (see Figure 18). The three questionnaire items included:

- To what extent do you feel that frequent AARs (every 6-8 hours) were more valuable than a single summary AAR for a multi-day exercise?
- To what extent do you feel that the AARs were valuable for the brigade staff?
- To what extent was there enough time to prepare for the AARs?

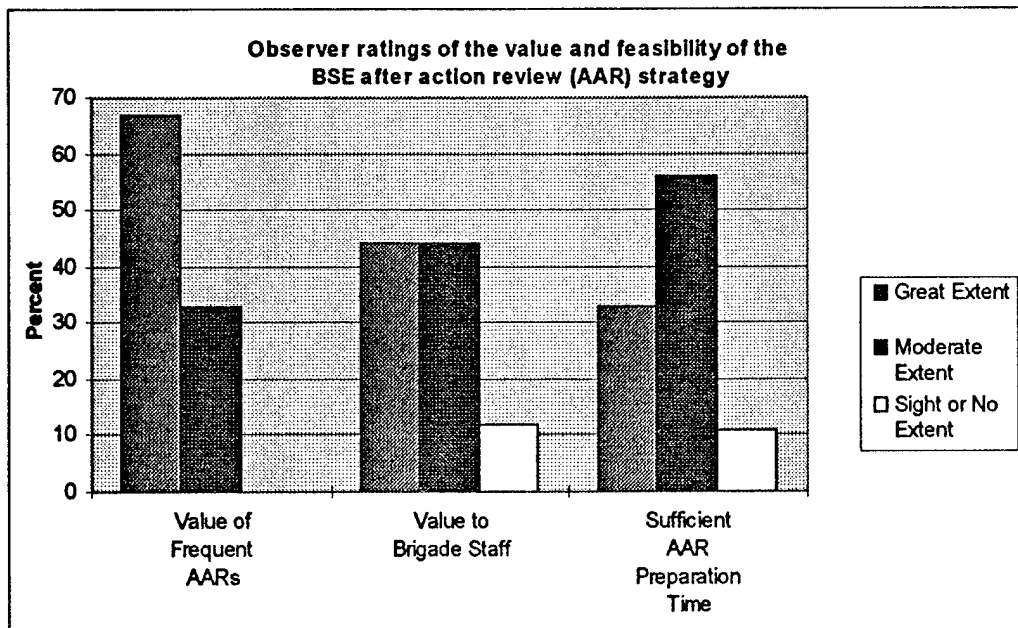


Figure 18. Feedback on the Brigade Staff Exercise after action review structure.

Several observers also provided comments about the AAR structure. Those comments included:

- I felt there were too many AARs, which prevented me from doing one-on-ones with my counterpart. I feel there should be three AAR times: kind of a beginning, middle, and end, and in-between have a pause-ex for a half-hour and have the O/Cs give feedback to their counterparts and then see if they do some adjustments based on O/C recommendations.
- Time was a little tight, but [the AARs] are pretty informal, and “pre-done” slides in TSP make it OK.
- The one-on-one AARs between the observers and staff are most productive but most difficult to fit in because the staff is so busy.
- Frequent AARs are good, so we can correct as we go along.
- AARs as “start-stop” activities seemed to disrupt the flow. May want to make AARs more on-demand, when they have trends.
- AARs are too many or maybe too elaborate. May want an option for pausing the exercise, not full stop. Might be better than pulling up stakes for AAR.
- Supplement AARs with a take-home package.

Exportability. A key focus of the evaluation was on measuring the extent to which the trial unit could implement the exercise without the support of the development team—the issue of exportability. Both the simulation center OIC and the COBRAS Coordinator stated that they would be able to plan a BSE implementation for the first time by relying on only the materials in the TSP, without the support of the developers. In addition, they both strongly agreed that, having run the exercise once, they could set it up for another unit or coach them on how to do it.

Implementation conditions. Another design question that was investigated concerned the 8-10 hours-per-day training schedule used in the BSE, as opposed to a 24-hour continuous operations arrangement. Feedback was mixed among the brigade staff. Some indicated that the shorter days allowed them to focus on the training issues and to have “time-out” periods in which to discuss processes or catch up. Others felt that the 24-hour operations, because it more closely replicates a CTC or deployment situation, would be more valuable. Because the BSE is intended to be used with less mature staffs, who are still working out their processes and require less stressful conditions, these responses were considered to be supportive of the 8-10 hour day. Figure 19 presents the distribution of training audience responses on training day length.

The final design issue concerned placement of CPs in the simulation center, as opposed to putting them in the field. Figure 20 indicates the training audience responses to the question. Again, their responses indicate a division of opinions. The same reasoning holds for this issue as for the previous one: that the decision to use CPs in administrative, indoor settings (and less-than-24-hour-days) was made in order to support optimal learning environments for the staff, rather than to present complete realism. However, one observer commented that, in a field CP, the staff have all of their tools and know where they are. In the simulated CPs, they had to consciously stock and locate all of their tools.

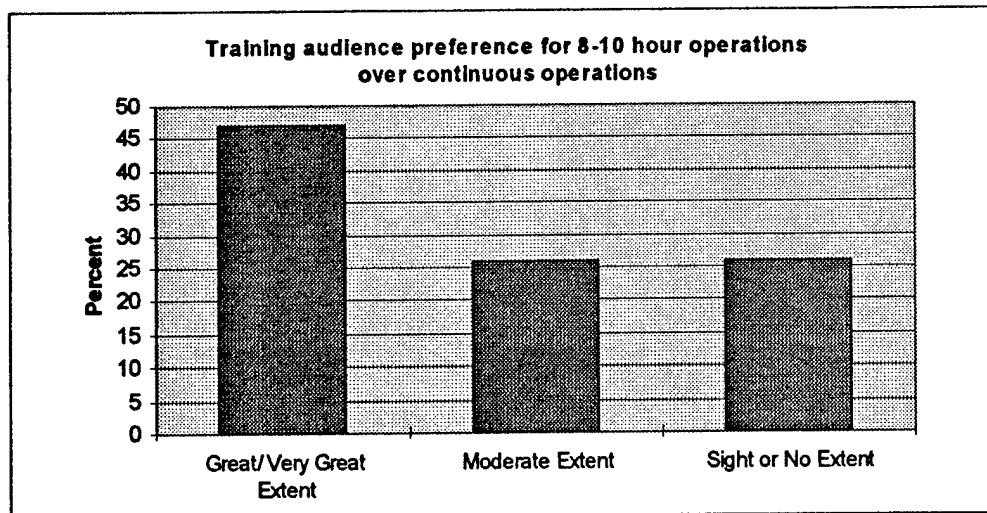


Figure 19. Feedback concerning 8-10 hours-per-day training.

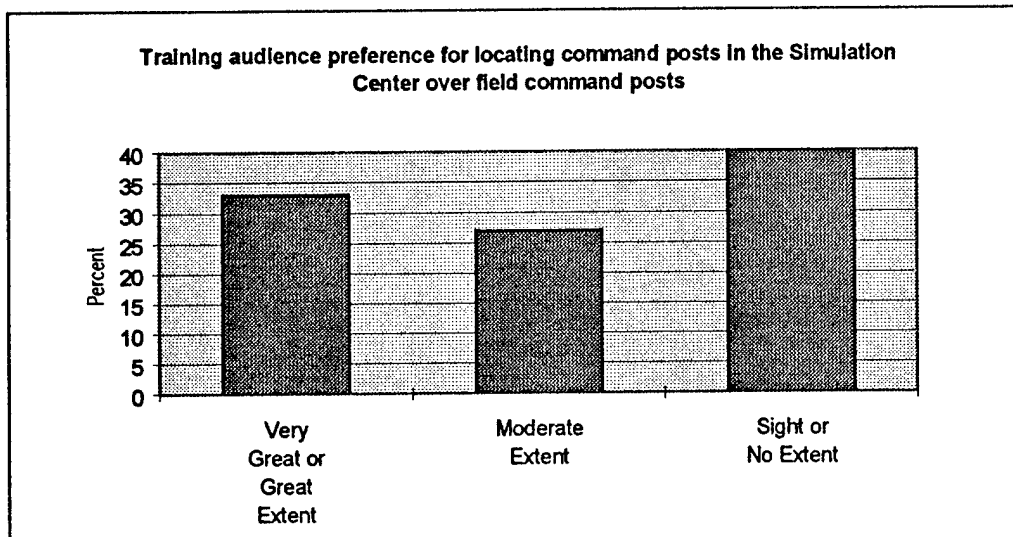


Figure 20. Feedback on location of command posts.

Training Support Package Findings

The second component of the trial evaluation focused on the TSP. The evaluation approach relied on questionnaires that addressed all aspects of the TSP, supplemented by interviews with participants to address specific areas in more depth. The specific issues were:

- whether the TSP provided sufficient description of various aspects of the BSE,
- the extent to which the TSP facilitated performance during the exercise, and
- the extent to which the TSP was organized in a way that facilitated its use.

TSP description of the BSE. One function of the TSP is to describe the training that will occur, including how it should be conducted and how the TSP materials should be used. One question asked how well the TSP described the exercise in general. This question appeared on every questionnaire. The results, as shown in Figure 21, were mostly positive among the roleplayers and observers, while training audience members and interactors were more neutral on the question. Most of the administrative participants (simulation site OIC, COBRAS Coordinator, and BBS site staff) were also positive, although the Blue Forces Controller was not.

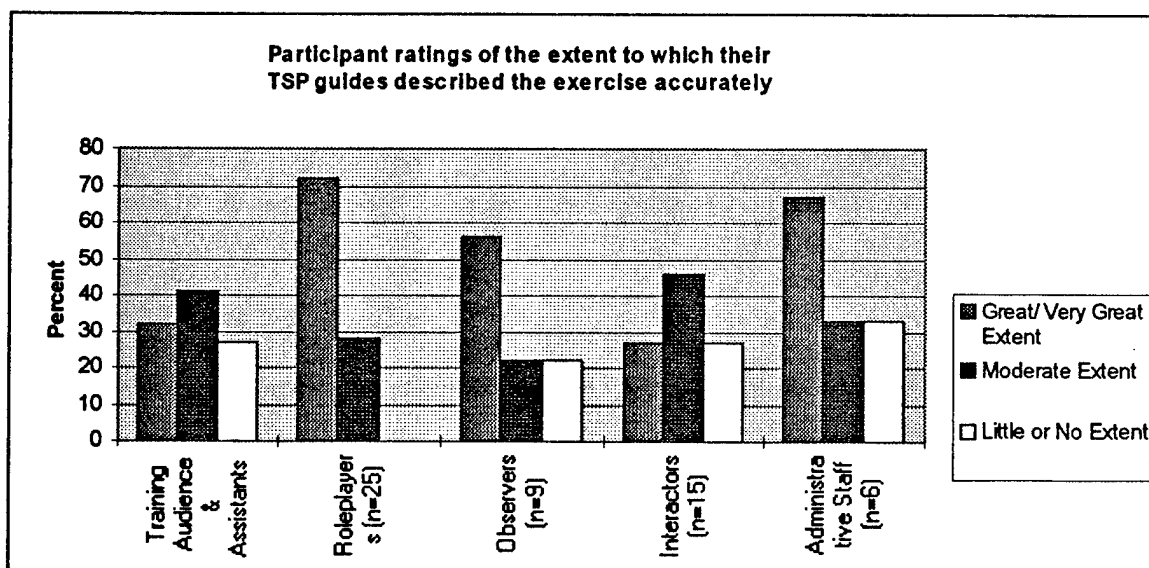


Figure 21. Feedback on the description of the exercise in the participants' guides.

When asked whether the guides helped them understand their roles, most responses were again positive among training audience, roleplayers, and observers (see Figure 22). All of the administrative participants were also positive about the descriptions of their roles.

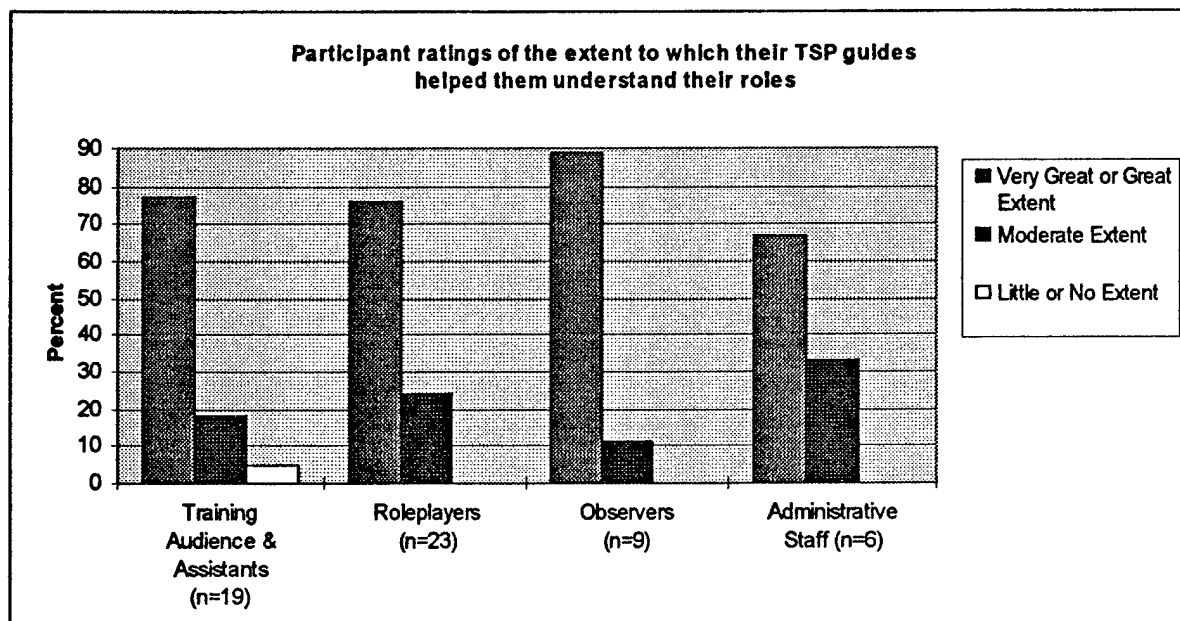


Figure 22. Feedback on the description of the participant roles in the guides.

TSP facilitation of performance. Another aspect of the TSP that was evaluated addressed the effectiveness of the TSP in facilitating performance during the exercise. Although most responses from the training audience members, the brigade staff assistants, and the roleplayers are positive (as shown in Figure 23), the more positive responses are from the less-experienced roleplayers, with more temperate responses coming from experienced staff members.

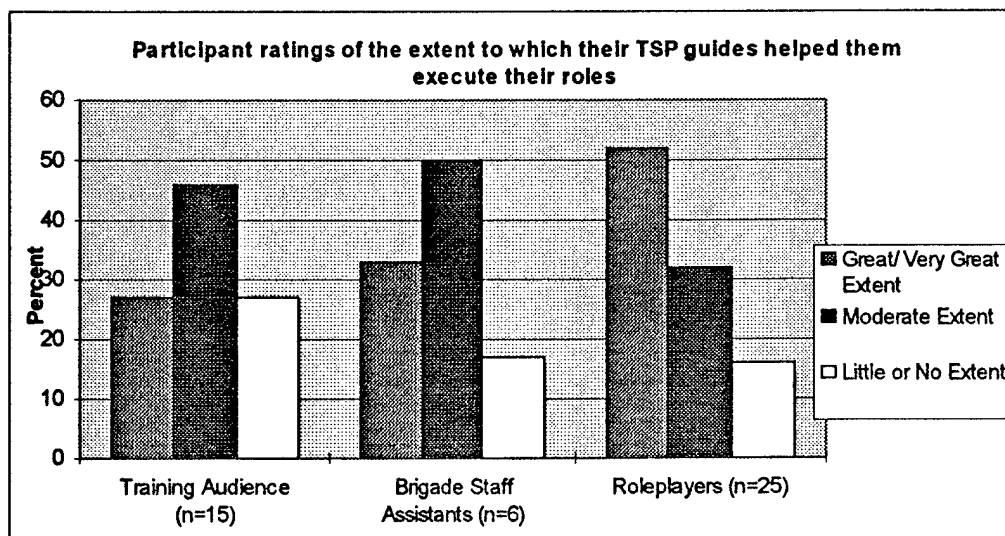


Figure 23. Feedback on how well the training support package helped participants execute their roles.

TSP organization. The final aspect of TSP evaluation addressed the extent to which the guides allowed participants to find information in the TSP as they prepared for the exercise and as they performed during the exercise. Overall, as shown in Figure 24, the design of the TSP was considered adequate.

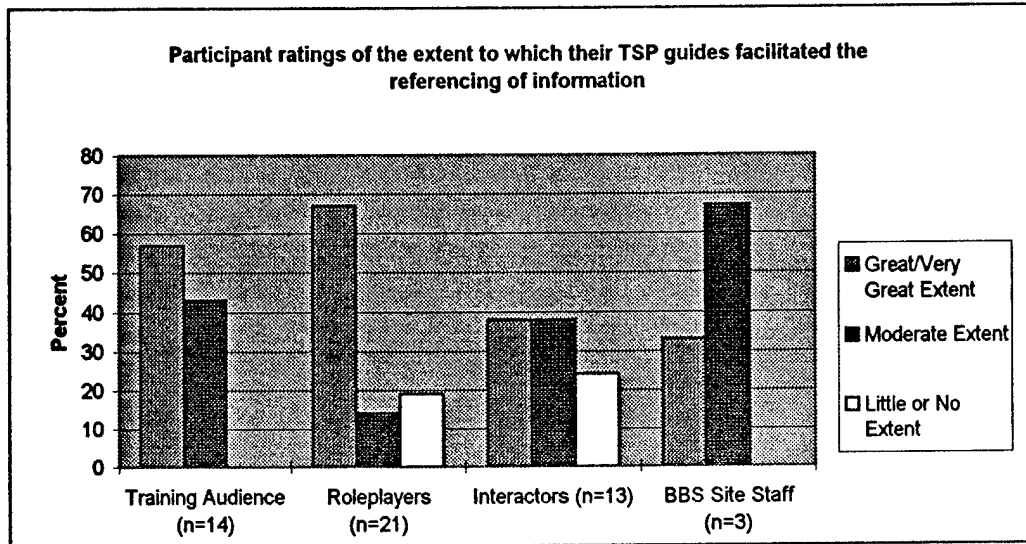


Figure 24. Feedback on the organization of the training support package.

Training Benefit Findings

While it was not possible to directly measure the effectiveness of the training, the questionnaires did address perceptions of training benefit. Several items focused on the general value of the BSE. The items were:

- To what extent was your experience worth the time spent? (asked of the training audience, brigade staff assistants, roleplayers, and interactors)
- How valuable will the [BSE] experience be to you? (asked of brigade staff assistants, roleplayers, and observers)
- How does the BSE compare to other types of brigade staff training in terms of utility (benefit versus time and effort required)? (asked of the training audience)

Responses were very positive, as shown in Figure 25, Figure 26, and Figure 27. It is interesting to note that participants who were not part of the primary training audience and were classified as “supporters” of the exercise were also positive about the value of the exercise for themselves. This generally favorable view of the BSE, as indicated by participants at various levels, is supported by several specific questions concerning training benefits.

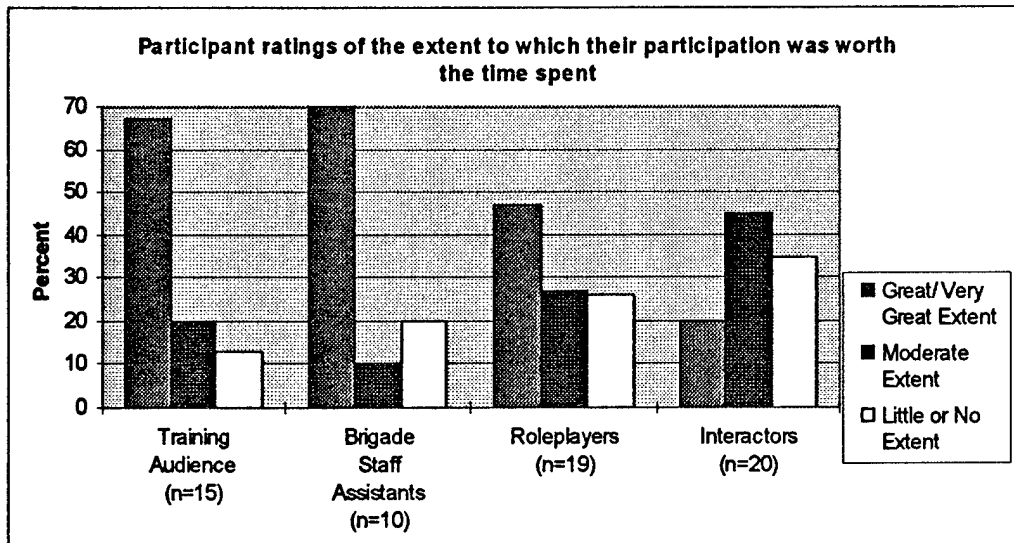


Figure 25. Feedback on whether the experience was worth the time spent.

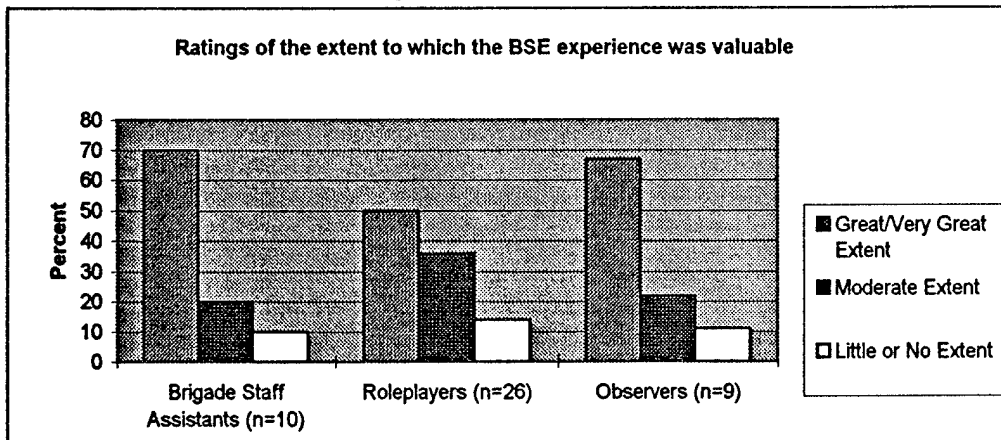


Figure 26. Feedback on the Brigade Staff Exercise value for non-training audience member participants.

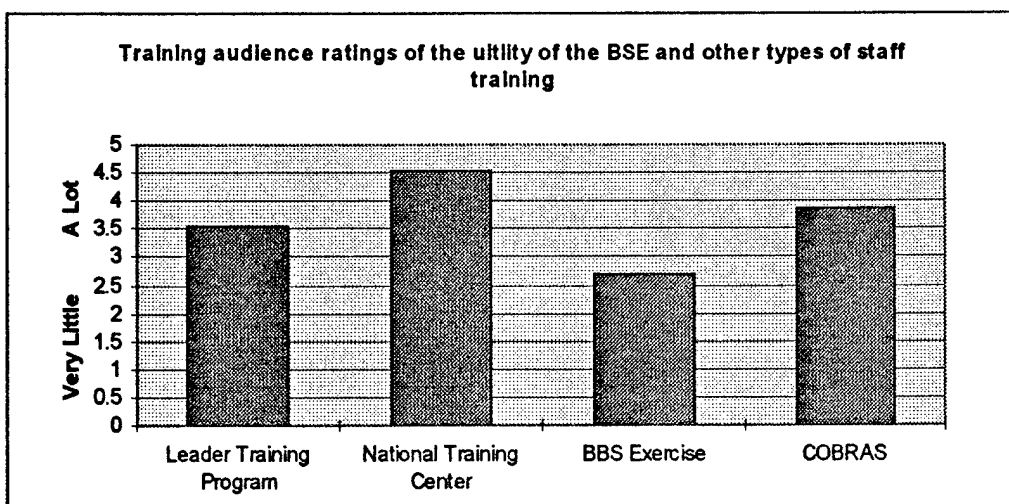


Figure 27. Feedback concerning the utility of the BSE and other brigade staff training.

To obtain impressions of how the BSE benefited participants, participants were asked to list the top three benefits they received during the exercise. Their responses varied widely, indicating a great diversity of perceived benefits (listed in Figure 28).

Participant Group		Benefit
Training Audience	Training the staffs of entire brigade	Plan, prepare, and execute deliberate using DDMP
	Rear command post operations	Orders process/prep/brief
	Information flow	Wargaming
	Refine SOP	Mission analysis practice
	Reporting process	Learning how the brigade commander fights
	Tracking battle	Learning brigade commander's focus for my BOS
	Teamwork—first time staff went through this process	Synchronization and integration of BOS
	Section personnel training in DDMP	Getting familiar with current brigade staff
Brigade Staff Assistants	Opportunity to work, build teamwork with battle staff	Planning brigade operations
	Awareness of the operational plan	S2 planning—time management
	Understanding the orders process	Rehearsal
	How to complete reports	Battle tracking and synchronization
	Validation of SOP	Commander's expectations and views
	Developing system for DDMP	Identification of areas to improve
		Military occupational specialty-related skills for brigade/battalion staff
Roleplayers		
Task Force	Improve battalion staff DDMP	Utilize new charts to track military intelligence assets
	Planning process	Tracking logistics
	TOC operations	Anticipating logistical needs of the task force
	Synchronization	Executing resupply
	Command and control	Validate SOPs
	Reporting	Work with other staff
	Battle tracking	Learn how orders group works
Engineer	Identify areas where brigade cannot support engineer logistics	Procedure for requesting supplies from bde
		Validate engineer battle book

Continued on next page

Figure 28. Feedback on Brigade Staff Exercise training benefits.

Participant Group		Benefit
Roleplayers		
Chemical	Practice briefing my unit's capabilities to brigade	Practice digesting brigade order and figure out how it applies to my units
Fire Support	Radar management	Interaction with brigade S2
	Ammo management	Experience with OPFOR that moved and fought
	Clearance of routes	Executing counterfire missions acquired by Q36
FSB	Learning heavy [organization] doctrine	Better understanding of duties of combat health support officer
ADA	Working with the TOC	
EXCON	Battle tracking	How division staff operates
	OPFOR tactics	Synchronizing division fight
	Briefing skills	
Interactors		
	A chance to play OPFOR	Introduction to possible roles in the field
	Able to see the big picture	Introduction to logistics operations
	Working with other cells	Introduction to task force headquarters operations
	Working with the TOC	Learned how complex combat service support operations are
	Making the TOC do its job	Ensuring all slice elements have good cross-talk
	Understanding battle tactics	Exposure to division decision-making
	Good commo exercise	Exposure to division staff and coordination
	Saw and felt the reporting systems	Dispersing supplies, evacuation, maintenance
	Learned more about brigade SOP	Got to see inter-branch interactions
	Overview of how field artillery battalion works	Opportunity to experience staff operations of combat
Simulation Site Staff		
	BBS experience	New BBS workarounds
	Game-building experience	A look at other databases and archives

Figure 28 (continued). Feedback on Brigade Staff Exercise training benefits.

Other items asked participants to estimate the extent to which the training contributed to their knowledge of brigade staff battle tasks, gave them practice opportunities, or helped them improve their skills. Responses to these items, again generally positive, are summarized in Figure 29, Figure 30, and Figure 31. An additional question, concerning the amount of practice in staff decision-making, received overwhelming support from all of the training audience members.

It is gratifying to note that the BSE is perceived more positively in terms of practice and skill acquisition than in the area of knowledge acquisition, as the BSE is designed specifically for training and practice, rather than for teaching and learning.

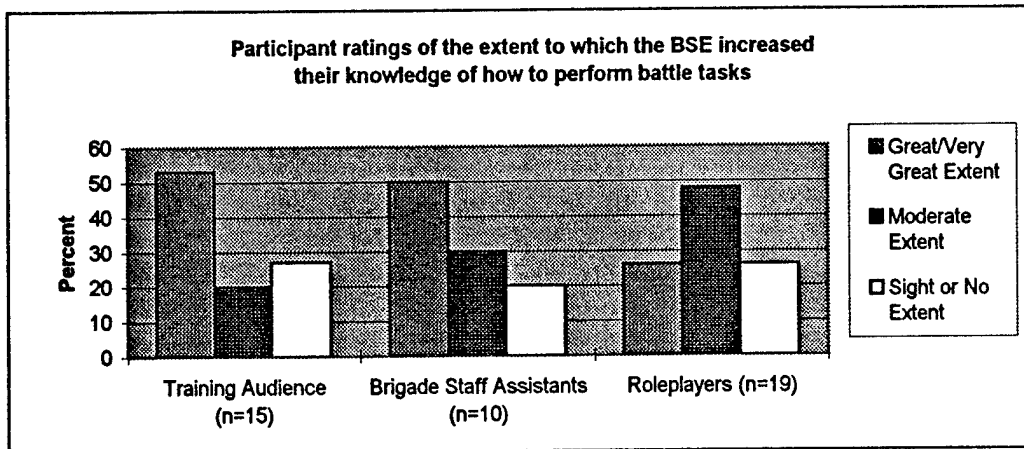


Figure 29. Feedback on the Brigade Staff Exercise contribution to knowledge of how to perform battle tasks.

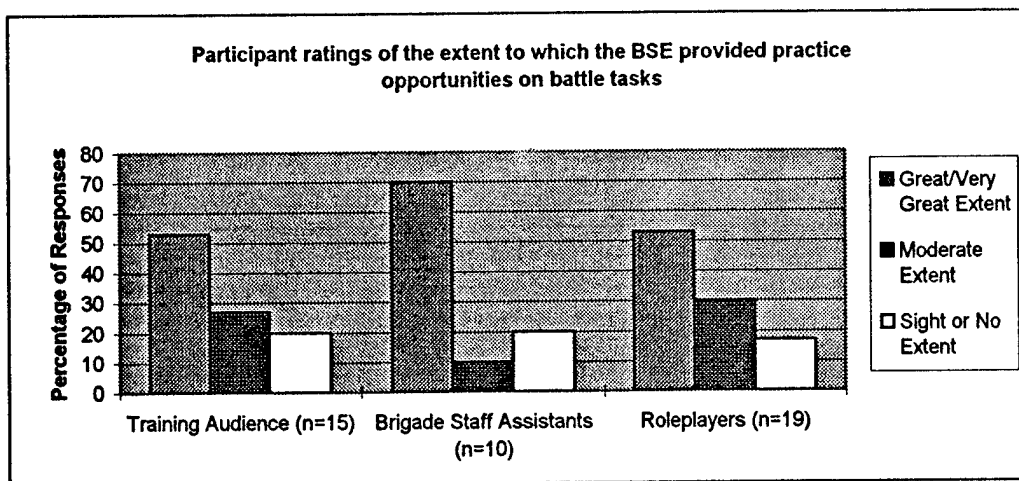


Figure 30. Feedback on the extent of Brigade Staff Exercise practice opportunities on battle tasks.

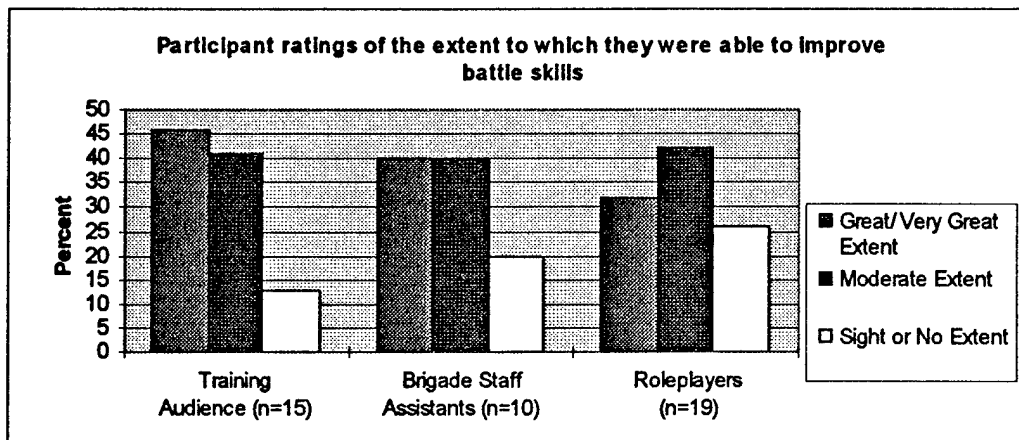


Figure 31. Feedback on Brigade Staff Exercise contribution to improvement of battle skills.

Finally, participants were asked about the use of BSE within a brigade's overall training strategy. Specifically, the first question asked about the value of the BSE for brigade staffs with many new members; all of the training audience members indicated that the BSE would be of great value to newly-formed brigade staffs. Another question, addressed to all of the participants with wider involvement in brigade training, asked what priority should be given to use of the BSE for such brigade staffs. Among the training audience (n=15), EXCON roleplayers (n=6), and administrative staff (n=3), 96% assigned either very high or high priority; the remaining 4% (one person) assigned moderately high priority.

A third item asked specifically how the BSE should be fit into a brigade's overall training strategy. Responses varied from quarterly, to during preparation for field exercises, to being used as evaluation event to determine staff improvement. Their responses are shown in Figure 32.

Program Revisions

All in all, the evaluation results from the trial implementation were encouraging. The BSE design decisions were supported, the TSP was perceived as adequate in content and structure, and the BSE is seen as providing training benefit, especially for newly-formed brigade staffs. Various minor errors were caught (or pointed out by participants), all of which were noted and corrected. But no serious design or content flaws were discovered.

There were many indicators for future development, however. While the BSE was observed to be a useful training tool for brigade staffs (especially less mature staffs) that emphasized the decision-making process and CSS activities, other areas of concern in brigade operations were discussed. Some of these areas are discussed in Section 7.

Training Participants	Comments on Use of BSE in Brigade Training Strategy
Training Audience	<p>Everywhere. I'd conduct it a couple of times a quarter. Given the orders and supporting documentation, even without BBS, great value to working the orders process only.</p> <p>Excellent training package to train a new battle staff, plus it provides an excellent low cost, low overhead vehicle to conduct staff sustainment training.</p> <p>Should be done quarterly to keep warfighting skills sharp.</p> <p>Has to happen early, often, and as a graduation exercise</p> <p>I think it needs to be a quarterly event. The problem would be in having [observers] every quarter.</p> <p>Excellent initial and mid-point training event.</p> <p>A train-up for future field exercises.</p> <p>Initially, it is a great tool to see what level the brigade staff is at. After several exercises (in a field environment), it would be a great tool to see how much the staff has improved.</p>
Administrative Staff	<p>As a validation gate or checkpoint prior to a major field training exercise or CTC rotation.</p> <p>Excellent tool as a team-builder for new staff. Therefore, exercise should take place after significant staff turnover. Should also be used as a pre-cursor to a NTC train-up and also as a validation exercise just prior to the CTC rotation.</p>

Figure 32. Feedback on how the Brigade Staff Exercise should be included in a brigade's training strategy.

Summary

The formative evaluation and trial implementation of the BSE were parts of an ongoing large-scale effort that required considerable time and effort. However, they were necessary in order to obtain the information from both users and observers concerning the scenario, the TSP materials, and the implementation model.

Although the vignettes were visibly different from the BSE, they were built on much of the same foundation as the BSE. The clearest linkage is in the training audience, the scenario events, and the performance objectives. They are also similar with respect to the design and development cognitive processes and TSP structure, even though the actual TSP materials have a very different appearance. The vignette development and evaluation are described in the following section.

SECTION 5: DEVELOPMENT AND PILOT TESTING OF THE BRIGADE STAFF VIGNETTES

Unlike the BSE, the COBRAS II vignettes were to supplement, rather than replace the COBRAS I work. In COBRAS I, 13 vignettes had been developed, although two were pulled from production because they were simply not ready for use. In COBRAS II, 11 new topics or events were selected for vignette development. Additionally, the two vignettes that were still incomplete from COBRAS I were to be reengineered and finalized.

The original 11 vignettes had still not been implemented or tested at the time of COBRAS II development. Thus, strictly speaking, there were no trial results or “lessons learned” to guide the COBRAS II development. However, instructional design principles were applied again to the model, resulting in minor changes in the way that the vignettes were structured and presented.

The refined model has been fully documented in C. H. Campbell, Ford, and Campbell (in preparation). This section of the report highlights the process of development. The topics covered include:

- *Initial Vignette Development:* The SOW (ARI, 1995) required that 12 additional vignettes be developed, focusing on the newly expanded target training audience. At least two of the vignettes were also to incorporate vertical linkages with the brigade’s maneuver battalions. The use of virtual or constructive simulation was to be explored, and the same scenario that was used in the BSE was to underlie the vignettes. This section describes how developers worked from that guidance to designate the specific new audience members.
- *Conduct of the Pilot Test, Results, and Revisions:* The pilot test design and implementation are described, and results and subsequent revisions are summarized.
- *Final Internal Review:* In the absence of a trial implementation, an intense and rigorous internal review was conducted, resulting in significant changes to the vignettes. The final package and TSP materials are described.

Initial Vignette Development

Development of the vignettes began shortly after the initial BSE decision-making was completed. As described in Section 3, COBRAS staff had designated the 16-person training audience, performed preliminary design work on the scenario for the three missions, and started the ModSPA analysis of job requirements (tasks). These three components of the initial design work—training audience, scenario, and tasks—formed the foundation for vignette development. The vignette-specific training audience groups were subsets of the full BSE training audience. Likewise, the vignette-specific events were derived from the overall BSE scenario, although some METT-TC elements were allowed to vary in order to focus the vignettes on specific activities.

The ModSPA and the resulting task lists and sample products served as the basis for the vignette objectives. Vignette developers used the basic individual task lists to derive corresponding small group performance lists addressing the event and activities of the vignette. These process lists were further expanded into a series of probing AAR questions that the vignette training leader uses to stimulate discussion of the exercise.

Following the same process of scenario examination used in COBRAS I, developers prepared drafts of 12 vignettes. For each vignette, internal expert reviews of tactical content, instructional value, and performance description were conducted. Each was enacted several times within the project staff to check on quality and consistency. In the process, one vignette was dropped because it was too broad, both in content and in audience, to fit the definition of a vignette.

At the same time, the approach to simulation-based vignettes was receiving another hard examination. In terms of benefits, simulation has the potential for providing significant training benefit. There are at least six ways in which simulation could enhance training, including:

1. Efficiently replicate battlefield activity, using simulated units to stand in for large support requirements.
2. Generate cues for training audience task performance as opposed to trying to manually generate dynamic conditions of battlefield.
3. Provide outcomes to battlefield actions which are reasonable.
4. Provide standardized training conditions.
5. Provide instructional features that enhance efficiency and effectiveness, including performance measurement.
6. With replay capabilities, can support providing objective feedback.

However, if the simulation does not significantly achieve one or more of these advantages, then it is not an enhancement to training. In the case of vignettes, COBRAS developers found that simulations were often not of sufficient benefit to justify the resource cost. This is primarily because staffs "see the battle" from their CPs via reports, messages, and other means. If the events being trained are of relatively short duration or are not particularly dynamic, a simulation is often not necessary. It is relatively easy to produce scripted cues or inputs sufficient to drive the training of these types of events. In fact, the use of a simulation will likely drive up support costs in these cases. Additionally, the short time duration of vignettes is usually insufficient to allow the simulation to fully portray outcomes of decisions and actions. And for vignettes that focus on group interactions and synchronization, instructional features such as replay capabilities are rarely useful (although they may be appropriate for evaluating tactical decision-making).

Thus the cost-benefit considerations lead to the conclusion that simulation is a significant contributor to training value only if:

- the vignette scenario requires representation of weapon systems or troops to provide essential tactical realism, dynamically cue the training audience, and react to the training audience; and
- the vignette can be extended to more than four hours, to allow the situation to develop.

The alternative to using technology-based simulations is to use "live" simulation. In the context of most vignettes, this is relatively easily accomplished. The training participants, normally located in a CP, can perform the vignette in an administrative CP (i.e., any room large enough to work in). Communications may be represented by means of written messages or by

having the training monitor simply provide any necessary information. By using this type of simulated environment, resource costs are kept low, and the vignettes become more feasible as unit-administered exercises.

For these reasons most of the vignettes developed for COBRAS II were designed for "live" simulation. As in COBRAS I, the staff explored use of simulation in two vignettes. Based on lessons learned in the BSE trial implementation, the materials to support the simulation operation were revised for the two COBRAS I simulation-based vignettes as well.

During the COBRAS II vignette development process, 12 new vignettes were developed, as well as the two substantially revised COBRAS I vignettes. The evaluation plan called for trial implementations of all of the vignettes using brigade personnel in all roles. This plan required assistance from an actual brigade staff for a minimum of 10 days, as well as participation of members of maneuver battalion staffs for four days. While developers were aware that the request would prove difficult to fill, it remained the only way to fully validate the vignette designs and TSP materials.

Conduct of the Pilot Implementation, Results, and Revisions

Because the actual assets required for the planned trial implementation were unavailable, it was necessary to revise the evaluation plan. A second plan was prepared, comprising the pilot implementation of a limited set of vignettes with roleplayed brigade and battalion staff members.

The Pilot Implementation Plan

Five vignettes were selected for the pilot implementation. They were selected as being representative of the complete set in terms of their lengths and number of participants, as well as being the vignettes for which appropriately experienced participants were available. The five pilot vignettes included:

- Vignette 14: Develop a Reconnaissance Order
- Vignette 16: Plan Deliberate Smoke Operations
- Vignette 19: Conduct Abbreviated Decision-Making Process
- Vignette 22: Conduct a Brigade Rehearsal
- Vignette 23: Plan a Combat Service Support Rehearsal

The participants, while not members of intact staffs, would have the equivalent levels of staff experience as the target training audience members. The feedback obtained from observations and from the participant interviews would be interpreted with caution, in light of the disparity between the constitution of the pilot participant group and the targeted training group. Information would be generalized to the full set of COBRAS II vignettes to assist in refining the materials and design.

Pilot participants included groups of U.S. Army personnel from Fort Knox (armor, engineer, and chemical experts), Fort Lee (logistics experts), Fort Sill (field artillery experts), and Fort Huachuca (intelligence experts). One individual from a contract effort at Fort Knox served as the Training Coordinator. Normally, it is recommended that the Training Coordinator, who

facilitates the vignette preparation, conduct, and discussion, be the unit XO. The Training Coordinator roleplayer had recent experience as a training observer, but not as a brigade XO.

Pilot Implementation Findings

Several key points emerged from the pilot implementation of the vignettes. These points were synthesized from developer observations and participant comments. In summary, they included:

- Participants were often confused regarding precisely what they were to do during the vignette.
- A lack of specificity in the tactical products (e.g., commander's guidance) frequently led to "dead ends," in which participants and the Training Coordinator were unable to determine the significance or even the meaning of information and could not proceed.
- Training objectives and tasks were not always well-defined, and did not, in those cases, support the vignettes in providing learning for participants.
- The designated participants for some vignettes were not appropriate for the vignette activities; in particular, materials sometimes required participation for only small, insignificant activities within the scope of the vignette.
- Excessive amounts of tactical materials were provided in the TSPs, which proved to be overwhelming as participants tried to absorb the tactical situation.

The active involvement of COBRAS vignette developers enabled the participants to work through most of the difficulties, and a great deal of valuable and specific information that was helpful in refining the vignettes was obtained. However, the overarching conclusion was that the vignette TSPs left participants confused as to what they were trying to accomplish during the vignettes.

Final Internal Review

After the pilot testing, the notes and observations were aggregated and analyzed in order to determine changes necessary. Because only five of the vignettes were tested, however, the COBRAS staff attempted to generalize the results to all of the vignettes. In the process, it became obvious that all of the vignettes suffered from internal inconsistency in the tactical situations and materials, lack of clarity in the instructions and guidance, and vague or even indefensible statements of performance requirements.

The conclusions were daunting but inescapable: The vignettes required significant review and revision on all aspects, including tactical content, instructional design, and performance requirement specifications. In the absence of U.S. Army military personnel on whom to try out the vignette materials, rigorous evaluations would be conducted using COBRAS personnel and staff from related projects.

The review process took the form of a complete reconstruction of all of the vignettes. A series of internal workshop sessions was instituted to guide developers through the design and development work. Developers worked in teams of SMEs and training developers, guided by

four senior training developers on the COBRAS staff. The workshop sessions led the teams back through the full development process.

As an outcome of the workshop, all of the non-simulation vignettes were overhauled. It required additional guidance and time to complete the simulation-based vignettes (both the two new ones and the two COBRAS I vignettes that were being reconstructed). Thorough reviews and in-house trials of each vignette were useful in discovering and correcting inconsistencies in tactical materials. The final complete set of live and constructive simulation-based vignettes, from both COBRAS I and COBRAS II, is shown in Figure 33.

A top-down review of the vignette TSP structure also led to a redesigned structure for the materials (see Figure 34). Finally, the *Guide to Use and Implementation of Vignettes* was modified to include the new vignettes and to correct guidance concerning the simulation-based vignettes.

Another outcome of the workshop was a formal documentation of a methodology for development of vignettes (C. H. Campbell, Ford, & Campbell, in preparation). The methodology is based on the more general *Methodology for Development of Structured Simulation-Based Training* (C. H. Campbell, Deter, & Quinkert, 1997), with specific guidance pertaining to small group exercises. That specific guidance concerns the detailed event analysis that must precede development, the requirement to trim the audience to essential participants and to provide only the necessary and sufficient tactical materials, and considerations in formulating AAR questions. The methodology is summarized in Appendix C.

Summary

In retrospect, it is clear that carving a small segment of staff performance out of the context in which it is usually nested is very difficult. Deciding who is involved in the activity, as opposed to who might be involved, requires hard choices that are always subject to second guessing. Creating efficient products and processes that lead up to the event requires creativity and a detailed knowledge of what is going on in staff processes and in the minds of staff members. Sorting “nice to know” from “must have” information requires dissecting how decisions are made and what they are based on. Finally, creating products that are logical end points or outputs of the events requires detailed knowledge of formal and informal staff products which reflect matched activities and bound just the event selected for training.

All of these factors make complete, efficient vignettes one of the most challenging training development efforts. As developers finally produced the vignette TSPs, it became apparent that development of a single small group exercise is not much easier than development of a full integrated exercise, such as the BSE. The lack of full trial implementations was unfortunate, although the limited pilot tests yielded crucial information concerning the overall set of vignettes.

Vignette		Participants
1	Plan for Dislocated Civilians	S1, S2, S4
2	Plan Refuel on the Move	S4, FSB Cdr
3	Develop a Concept of Service Support	S1, S4
4	Develop a Reconnaissance and Surveillance Plan	S2, S3
5	Conduct Target Development	XO, S2, S3, FSO
6	Develop Air Defense Concept	S2, S3, ADCOORD
7	Develop Contingency Plan	S2, S3, FSO, ENG
8	Conduct Mission Analysis	XO, S1, S2, S3, S4, FSO, ENG, ADCOORD
9	Develop Courses of Action	XO, S1, S2, S3, S4, FSO, ENG, ADCOORD
10	Conduct Course of Action Analysis	XO, S1, S2, S3, S4, FSO, ENG, ADCOORD
11	Conduct Special Staff Rehearsal	XO, S2, S3, FSO, ENG, ADCOORD
12	Develop a Reconnaissance Order	S2, S3, S4, FSO, ADCOORD, ENG, SIGO, MI Co Cdr, CHEMO
13	Develop a Course of Action Branch	S3, FSO, AVN LNO, ENG
14	Plan Nuclear, Biological, and Chemical Defense Operations	S2, S3, CHEMO
15	Plan Deliberate Smoke Operations	S2, S3, FSO, CHEMO
16	Plan Brigade Rear Battle	S2, S3, FSO
17	Plan Combat Service Support Rehearsal	S1, S4, FSB Cdr
18	Identify and Resolve Airspace Conflicts	S3, S3-Air, FSO, AVN LNO, ALO, ADCOORD
19	Conduct a Brigade Rehearsal	Bde Cdr, XO, S2, S3, S4, FSO, FSCoord, ENG, ADCOORD, CHEMO, Bn/TF Cdrs
20	Conduct Accelerated Decision-Making Process	Bde Cdr, XO, S1, S2, S3, S4, FSO, FSCoord, ENG, ADCOORD, CHEMO, SIGO, MI Co Cdr
21	Coordinate Mission Operations	XO, S2, S3, FSO, ENG, ADCOORD (Janus)
22	Coordinate a Mission Transition—Offense to Defense	XO, S1, S2, S3, S4, FSO, ENG, ADCOORD, FSB Cdr (BBS)
23	Conduct Parallel Planning	Bde Cdr XO, S1, S2, S3, S4, FSO, ENG, ADCOORD, FSB Cdr, CHEMO, MI Co Cdr (BBS)
24	Plan and Execute a Fragmentary Order	Bde Cdr, XO, S2, S3, FSO, FSCoord, ENG, ADCOORD, CHEMO (Janus)

Figure 33. Titles and participants of the COBRAS II vignettes.

TRAINING COORDINATOR AND PARTICIPANT GUIDES

- **BACKGROUND** – Familiarize Training Coordinator and participants with basic requirements for the vignette–participants, time, training coordinator duties.
- **SCOPE** – Describes vignette in terms of activities, training objective, and limitations on activities.
- **PREPARATION** – How Training Coordinator prepares self and participants; how participants prepare. List of preparation materials. Copy of administrative brief used for initial vignette orientation for participants.
- **EXECUTION** – How to start and conduct this vignette, list of execution materials, situation brief used to initiate the vignette (for Training Coordinator).
- **After Action Review (AAR)** – How to facilitate AAR and use sample products, list of AAR questions and response considerations (for Training Coordinator).
- **REFERENCES**

TACTICAL MATERIALS FOR PREPARATION

TACTICAL MATERIALS FOR EXECUTION

TACTICAL AND PERFORMANCE JOB AIDS

SAMPLE VIGNETTE PRODUCTS

SUPPORT MATERIALS (for simulation-based vignettes)

Figure 34. Structure and contents of the COBRAS II vignettes.

The following two sections summarize lessons learned from both BSE and vignette development. Section 6 focuses on lessons learned for future training development projects that are along the same lines as COBRAS I and II. Section 7 draws together many of the suggestions and indications of training needs that may guide initiation of future development projects.

SECTION 6: LESSONS LEARNED FOR THE DEVELOPMENT OF FUTURE TRAINING

Over the past 8 years, ARI and its contractor teams have accomplished a number of R&D efforts to incorporate structure into battalion and brigade-level training programs. The preliminary work in development of structured training scenarios was focused on the definition of threat conditions (R. C. Campbell & Campbell, 1990; Doyle, 1990). This work was vastly expanded in the initial development and expansions to the VTP (Hoffman et al., 1995; Graves & Myers, 1997; Koger et al., 1996) and the development of the COBRAS I program (Graves et al., 1997). Initial evaluations of such programs have indicated that, with a well-developed training structure, simulation can contribute substantially to the value of training (Shlechter, Bessemer, Nesselroade, & Anthony, 1995).

Program developers and sponsors, however, are well aware that the structured approach and development methodologies can always be improved. To that end, each of the ARI projects has produced a report, documenting "lessons learned" that may be useful in future development efforts. The lessons learned during the COBRAS II project represent the latest set, and are described below.

This project's lessons, which are few in number but of broad scope, were drawn from formative evaluation efforts⁸ in which design solutions and training support materials were evaluated in terms of their quality and their support of explicitly defined training objectives. The six lessons described below focus on:

1. the development process,
2. program design characteristics,
3. program implementation requirements,
4. use of training support products,
5. the nature of lessons learned, and
6. the value of structured training and TSPs.

All of these lessons should be of use to future program developers, whether they are design scientists who are responsible for delineating project objectives and design alternatives, or military and instructional specialists who construct TSPs.

Development Process

The development methodology (C. H. Campbell et al., 1995), described in Appendix C, is the model by which the COBRAS II exercises were developed. During the course of the project, developers were able to validate lessons learned during COBRAS I: that the initial decisions and constraints must be identified as completely as possible, and that the conduct of all formative evaluation activities is critical.

⁸ Here again, as throughout this report, "formative evaluation" refers to the project-long cycle of examine-evaluate-refine (as described in Section 2).

But developing training such as this is not an intuitive process. Being experienced in training or having done a great deal of training doesn't translate directly to being able to develop good TSPs. There is a global lesson concerning the use of a methodology in training development:

Using a procedural methodology during development of training is critical in producing a high-quality program.

Developmental discipline and having a sound process and procedure to follow will help to preclude omissions and "reinventing the wheel." The methodology for development of structured simulation-based training (C. H. Campbell et al., 1995) was understood by all of the COBRAS developers before the COBRAS II development began. Because it incorporated many of the lessons learned and experience from COBRAS I and previous projects, it spoke directly to the activities required in COBRAS II. As a result, the development and evaluation process for the BSE was relatively straightforward.

For the vignettes, on the other hand, no methodology had yet been articulated or formalized. During development, there was always a sense that something was missing, that certain steps were not understood, and that essential checks and reviews were not being done. The pilot implementation verified our fears: the products were not sufficiently clear, correct, or well-organized. Formalization of the process during the vignette development workshop brought all developers on line with respect to the steps in development and the standards for products. Use of the vignette methodology in future small group exercise efforts, or of similarly well thought out methodologies for other emphases, can only strengthen the quality and utility of the efforts.

Program Design Characteristics

The second lesson is as follows:

Structured training programs should be flexible enough to allow for implementation in various settings.

However, this lesson does not stand alone:

Corollary: The more changes you make, the more you need to understand the details of the exercise that you're changing.

The lesson itself is drawn from observations and comments during the December trial implementation of the BSE, as well as from the earlier trial of the COBRAS I exercise at Fort Riley. Although it recommends increased flexibility, it does *not* minimize the structured nature of the training. The focus on performance of specific stated training objectives for selected members of a unit remains as the primary objective and goal.

However, certain characteristics of the implementation required adjustment and modification during the trial implementations. One was the AAR schedule. The exercise design called for formal, slide-supported AARs at specified points in the exercise. In both implementations, the schedule was modified within the first day of the exercise start in order to provide more performance time as well as more AAR preparation time. In both instances, one AAR was dropped in the interests of time.

Fortunately, by the time of the December trial implementation, developers had anticipated the need for schedule adjustment. The TSP contained instructions for schedule modification, as well as guidance on the purpose of the AARs and how they tied together across the exercise. As a result, the adjustment was made and the critical feedback was provided to the unit. Several observers made time for informal group AARs in order to provide coaching and feedback without the benefit of slides or other more disruptive means.

The exercise was also modified in terms of task organization of the participating brigade, training audience participation, and use of AAR materials. COBRAS developers were consulted on the effects of changes to the task organization, and the questions and answers were incorporated into the TSP following the trial implementation.

In two other areas, brigade member participation and AAR structure, brigade members and observers simply made the changes that they felt were necessary. The changes were made easily, the training was not compromised, and participants expressed gratification that the flexibility was permitted.

The corollary to the lesson derives from a third implementation of the COBRAS II BSE that took place at Fort Lewis in May 1997. This implementation involved significant alterations to the BSE model, in task organization (use of one armor, one mechanized infantry, and one light infantry battalion), schedule (overlapping missions and concurrent planning and operations, rather than sequential missions), and OPFOR activity and aggressiveness. Because of the differences, this implementation was not considered to be an appropriate opportunity for formative evaluation data collection. However, COBRAS developers did assist with and observe the exercise.

As a result of the locally-made modifications to provide for overlapping missions, there was considerable confusion about the intelligence message traffic: The messages had been carefully timed to support a scenario that would cue brigade performance, and disrupting the timing not only made the messages confusing or incorrect, but also caused certain brigade tasks to be not cued. The brigade tasks and AARs that were tied to the scenario were no longer correct: Observers were forced to figure out what tasks to observe and what important behaviors of the brigade staff should be the subject of the AARs. These outcomes are precisely what define nonstructured training.

Thus, by making changes without a clear understanding of the linkages inherent in structured training, it is likely that a nonstructured exercise will be generated, using some of the useful products of the structured exercise. The value of the products will be lost when they are disconnected from other components.

Program Implementation Requirements

This lesson is related to the balance between structure and flexibility discussed above. It addresses some of the implementation infrastructure characteristics:

Features of structured training programs that support implementation are there for a reason and should not be modified.

The features referred to include distribution of materials, qualifications of participants (especially roleplayers), training for simulation interactors and workstation roleplayers, observer and division response cell preparations, and training audience preparation.

During both the August and December trial implementations, it was found that participants who did not have their materials prior to the first day of the exercise were unlikely to read the materials (also see the next lesson learned). Those who did have the materials and who read them found them useful. The conclusion is that the materials must be distributed in time for users to use them.

During the observed implementations, various positions at roleplayed workstations were not staffed according to the stated requirements. This was true during both implementations for one or more battalion workstations and for the division response cell (EXCON) workstation, and was observed at various other workstations as well. When this happens, participants need more instruction at the beginning and continual guidance throughout the exercise. Not only does this disrupt the realism of the input to the brigade, but it can cause developers to make significant changes to TSPs in order to provide sufficient guidance to under-qualified participants. A better solution would be for implementing units to ensure that all positions are filled by qualified personnel. This has the additional advantage of delivering valuable incidental training to persons who can best benefit from it, that is, incumbents in the brigade's subordinate and supporting units and at division level.

This exercise, like other unit training events, requires professionally competent soldiers to deliver the appropriate training opportunities. In complex group performance such as is required of a brigade staff, no TSP alone can completely replace a technically competent and committed staff.

The interactor training is key to getting the designed combat, CS, and CSS capabilities functioning in the exercise. Recognition of this need following the first trial implementation led to a more structured training session for the second trial. Unfortunately, the training was not used; the simulation site staff conducted their own standard BBS training. As a result, interactors were never fully familiar with the goals and requirements for the COBRAS II BSE. One solution, already being explored in other projects, is to present the interactor training in a less directive mode, listing the essential skills and knowledges for BSE interactors rather than telling the site staff how to ensure that the information gets to the interactors. A related need concerns training for roleplayers in the basics of BBS capabilities. When roleplayers do not spend preparation time with their workstation interactor team, we find that they are less skillful at performing the required tasks, including troop and unit movements, reporting, and responding to brigade directives.

Roleplayer and observer participants also need to dedicate time to becoming familiar with the tactical situation that underlies the exercise. In both trial implementations, the EXCON roleplayers spent considerable time (up to a day) pouring over the division OPORD, presenting a division OPORD brief to the observer team (roleplaying the brigade staff), and walking through the messages list provided in the EXCON guide. This activity was invaluable in helping both EXCON and the observers "get their heads in the game." It invariably led into detailed discussions of the tactical situation, the exercise flow, OPFOR activities, and brigade staff performance objectives.

Finally, training audience members (i.e., the brigade staff) need to be reminded that structured programs such as the vignettes and the BSE offer reduced preparation time, *not* zero preparation time. COBRAS and other programs with detailed TSPs have been promoted as turn-

key programs. It is true that the prepared division OPORDs and tactical products obviate the need to develop, wargame, write, and produce the division and corps OPORDs and tactical products, which are the major cues for brigade staff planning. The prepared messages provide the major events and additional cues needed to make the scenario successful. However, the brigade staff must begin its participation in the training before the first day of the exercise, with the intelligence preparation of the battlefield, logistics preparation, CP setup, and review of their TACSOP. Ideally, they would also meet to review the TACSOP as a staff, and would look into the doctrinal references listed in their guides. This is not wasted preparation time—it is an integral part of the training.

Training Support Products

The fourth lesson concerns the use of the materials and training products contained in the TSP. The lesson is that:

The utility of the TSP will be limited by the extent to which it is used.

This is (or should be) no surprise. A TSP that sits on a shelf or is not read will not be useful. In every implementation, the simulation-based scenario tapes or files and the tactical materials are always used. Indeed, these form the nucleus of the exercise. They are not adopted wholesale: Simulation site personnel and brigade members are prone to alter the materials and files to suit what they perceive to be a unique need for the particular implementation. Nonetheless, they invariably realize the essential nature of these materials and files.

The remaining materials—guides, job aids, training objectives, AAR materials, and so on—tend to be always used *if they are at all looked at*. That is, the simple step of opening the guide and reading the first page generally ensures that the user will read most of the remaining pages, follow the guidance, and report that it is helpful.

It's that first step—opening the materials and beginning to read them—that has proved to be difficult to accomplish. There have been many guesses about the reasons—too much reading, not enough time, materials not received early enough. Given that those who do start to read the materials usually read enough to find them useful, that first reason is negated, although the other two may be valid.

A solution to the difficulty is not immediately obvious. It has been suggested that orientations and introductions should be put on videotape or CD-ROM, on the assumption that users will learn better, or at least be drawn into the materials, if their first exposure is aural and nearly passive. However, there still remains the first step: to insert the tape or disk into the viewing mechanism. This is an area where definition of the problem does not suggest a solution; more study and experimentation is required.

Nature of Lessons Learned

An interesting feature of this report and other lessons-learned reports produced by ARI is the nature of the lessons learned, which itself leads to a lesson learned:

Documenting global lessons learned has a positive effect on continued development.

Every one of the lessons learned that was listed in the COBRAS I report was found to hold true for the COBRAS II experience. In many cases, we have been able to incorporate lessons in a next generation of training design or TSP. For example, the COBRAS II Exercise Guide for the Exercise Director contains guidance on how to modify the materials for different implementation situations (as well as cautions on certain types of changes).

Other lessons are doomed to be learned again and again. The lesson cited above concerning utility of the TSP and getting participants to read the materials has always been a problem. No solution yet presents itself. When reading the training program instructions becomes a way of life for trainers, we will have taken a giant step toward simplified and standardized implementation of training.

Value of Structured Training Programs and Training Support Packages

The final lesson derived from the COBRAS II development and implementation concerns the perceived value of these types of program:

Having tried out structured training and TSPs, units see the value of the programs as part of a training strategy.

During the course of the BSE trial implementation, participants made a number of remarks, both spoken and written, that provide insights into the value of structured training programs and TSPs like those provided in COBRAS II. The statements are shown in Figure 35. These statements, together with our observations of the products being used in a variety of settings, tell us that there is a requirement for structured training programs that focus on brigade combat team staff performance. There are two fundamental unit needs that such programs address: the need for continuous performance improvement, and the need for readily available training packages.

Performance improvement is a particular concern in today's shrinking force. Brigade staffs are continuously and rapidly turning over key people. Replacements come with little or no experience, and usually no relevant schooling in their brigade staff role. While the exercise may initially seem to address very fundamental skills of planning, preparation, and staff processes, in retrospect this seems to be exactly what is needed at the early stages in the training, maturation, and development of these "new staffs." A new staff that runs this exercise as designed will improve its ability to use several planning and preparation staff processes.

Type of Participant	Comment
Training Audience	Bde Cdr: We need more TSPs like COBRAS. COBRAS allowed me to maximize my training time with my staff with very little overhead. If I had run and resourced a BBS without COBRAS, the cost would be prohibitive– the leaders of a battalion– and the results not as good.
	Bde XO: Great training value at very little cost of resources.
	Bde S4: This is exactly what I needed as the Bde S4. Been in the job 3 months and this exercise taught me a lot. Very beneficial.
	MP Plt Ldr: I have only been associated with the Bde for about 3 weeks. My platoon is being “attached”/associated w/ 3d Bde solely for trainup to the National Training Center mission. This exercise was extremely helpful for me to see where I fit into the Bde picture. This was the first chance I’ve had to work with the Bde staff. This has helped to define my role in the planning and execution process of the Bde. Had I already been associated with the Bde and worked with them before, this exercise would have been more of a leadership learning experience.
Exercise Director	Really happy with unit use of your products...that’s a positive sign the unit thought a lot of these products. I am impressed with flexibility of COBRAS’ design. The AAR booklet is real good. Need TSPs for Plt through Bde.
COBRAS Coordinator	A very positive exercise from the Brigade perspective. It provided a new staff to team-build and build upon new processes and also allowed the Brigade Commander to establish standards. I believe the materials are sufficient to allow a staff to plan, prep and execute this exercise without much difficulty. An added value will be gained once more variants, in terms of mission, scenario, and locations are developed. This Brigade would greatly benefit from a COBRAS exercise in a Korean scenario.
Observers	Would love to have TSPs to use in my current job: Training NG enhanced Bde.
	Good exercise, worth refining and pushing out to as many units as possible.
	Enjoyed this exercise as an observer. I learned a lot. I would definitely want to do this again.
BBS Site Manager	More time devoted to training for COBRAS than a normal BBS which allowed the staff more time to prepare, and overall it contributed to a better trained staff.

Figure 35. Comments from COBRAS II Brigade Staff Exercise participants concerning the value of structured training and training support packages.

The ready availability of a training program will do much to recommend it to units. Using prepared TSPs will reduce the staff time and energy needed to prepare for and execute a structured training exercise. During the exercise, the TSP provides the conditions and specific cues that prompt staff actions. These conditions and cues are carefully cross-checked and integrated to provide doctrinally correct activities which permit the staff to focus on its processes rather than on the tactics of the exercise.

The statements also validate implementation decisions concerning the length of the training day. The exercise schedule supports frequent feedback and provides the staff the time to complete all its required activities, participate in feedback sessions, interact with subordinates, and be mentally fresh enough to master complex cognitive processes.

Summary

This section has presented and discussed some of the major lessons learned from the COBRAS II development and formative evaluation effort. Some of the lessons were based on direct feedback from pilot test and trial implementation participants, while others were based on observations of the implementations. Lessons were noted during all phases of the project, from the initial design through implementations.

The final section in this report describes some issues that remain to be addressed. Some, such as the COBRAS III program, are underway already. Others will be likely to demand attention in the near (5 year) future, if the U.S. Army is to continue with steady progress toward its Force XXI goals in training and readiness.

SECTION 7: FUTURE DIRECTIONS

Even as the COBRAS development and refinement was being completed, additional structured training R&D programs had begun. They are designed to follow up on additional training needs for brigade and below that were pointed out by users, observed by the COBRAS developers, or suggested by the Force XXI Training program and other stakeholders.

The most pressing needs that had been identified for development are listed below: The list is formidable, and only a few of these identified needs are likely to be addressed anytime soon. Those ARI-AFRU projects that are already underway or designated for imminent commencement are identified by a project code name following the description (code names are identified with ARI-AFRU project titles in Appendix A).

- A second BSE, on a different terrain data base;
- An expanded multiechelon version of the BSE, still in BBS (*COBRAS III*);
- A multiechelon BSE incorporating linked virtual (SIMNET and reconfigurable simulations) and constructive (BBS) simulation environments (*COBRAS III*);
- Expanded training for members of brigade and battalion staff sections (*COBRAS III*);
- More flexible implementation models that allow 24-hour operations, deployed CPs, more intense battle rhythms, and more robust and aggressive OPFOR activity (*COBRAS III*);
- A parallel version of the BSE for light and light-heavy units;
- A version of the BSE, incorporating CSS emphasis and the full planning and preparation phases, for maneuver battalions;
- Additional vignettes focused on maneuver battalion training needs;
- A supported implementation of a sequence of Force XXI programs with more complete assessment of implementation requirements and training outcomes (*ISAT*);
- Development of structured simulation-based training exercises using the Close Combat Tactical Trainer (*STRUCCTT*, *STRUCCTT II*); and
- Development of an automated tool to help commanders and unit trainers access TSPs, modify existing scenarios and TSPs, or create their own scenarios and TSPs (*CITT*).

The Next Step: COBRAS III

As shown above, the COBRAS III work represents an expansion to the COBRAS II BSE in several areas, including the training audience, implementation model, and simulation environment. COBRAS III comprises two major components: a constructive simulation Brigade and Battalion Staff Exercise (BBSE) and a linked constructive and virtual simulation exercise known as the Synthetic Theater of War Exercise.

The BBSE is incorporating several innovations in addition to the expanded training for brigade and battalion staff sections, 24-hour operations, deployed CPs, more intense battle rhythms, and more robust and aggressive OPFOR. One of these concerns an often observed and

voiced expectation that the BSE was most valuable as an NTC ramp-up exercise. This led to some sweeping and often confusing modifications in implementation, as witnessed in the May 1997 implementation at Fort Lewis (3 Bde, 2 ID). Among the modifications were changes in task organization (use of one armor, one mechanized infantry, and one light infantry battalion), schedule (overlapping missions and concurrent planning and operations, rather than sequential missions), and OPFOR activity and aggressiveness. All of these changes were intended to provide a virtual replication of the anticipated NTC experience.

The BSE was intended as a "crawl" level exercise, to help brigade staff members learn about their own jobs within the larger staff process, to allow them to practice interactions and information flow, and to give them experience in using all of their assets—combat, CS, and CSS. The May implementation was an attempt to adapt this exercise as a "graduate-level" exercise, preparatory to their NTC rotation. More than words, these actions expressed the brigade's need for simulation-based practice opportunities that would help to prepare them for a high-intensity, realistic field exercise and, by extension, for a real world mission-required deployment.

The COBRAS III BBSE is providing a portion of the solution to that training need. The BBSE will not be a replica of any one NTC or other CTC rotation. Rather, it will incorporate some of the features that provide valuable training, including 24-hour operations, deployed CPs, concurrent operations (overlapping missions). The training audience is the brigade commander, his primary and special staff and their sections, the maneuver commanders, and their primary staffs and sections. Training audience members are not specifically named (as in COBRAS II), but the brigade and battalion leaders are to be inclusive in who they bring to the exercise and to the AARs.

Because the BBSE is not expected to be implemented with a dedicated O/C team, does not use extensive real terrain, and does not have sophisticated data collection instrumentation (as at the CTCs), it can never be a "CTC-in-a-box." Rather, it is designed to provide home station training, prior to CTC rotation, that will enable a brigade to get more training value out of its high-cost CTC training.

Another feature of the COBRAS III BBSE that is aimed at enhancing the multiechelon aspect of the training and preparing the brigade and its battalions for the CTC (or deployment) lies in its designation of the program training objectives. Rather than focusing on procedural activities and brigade products and outcomes (as did the COBRAS II BSE), the training objectives are centered on techniques and procedures that give the brigade an edge in performing key high-payoff tasks. For example, one focus is on how the brigade and battalion CPs manage information throughout all phases of a mission. Another focus is on the planning and management of the reconnaissance and surveillance for the brigade. Yet another concerns how the brigade and battalions manage their parallel planning efforts. The materials for the training audience and the observers will contain descriptions of ways to enhance their performance of these key tasks, derived from the experiences of combat veterans and CTC observers (especially as documented by the Center for Army Lessons Learned [CALL] at Fort Leavenworth).

A second effort within COBRAS III is exploring the use of linked constructive and virtual simulations for multiechelon training. The prototype TSP is being designed for a one-time implementation at Fort Knox in early spring 1998. Products will include both the partially

complete TSP and complete documentation of the remaining developmental needs for both the TSP and the simulation itself.

Summary

The purpose of this report was to describe the development of the COBRAS II brigade-level training exercises and to offer lessons learned to the military training development community. The report began with a project introduction focusing on the project's background in terms of its relationship to COBRAS I. It then identified the project's objectives, scope, and development methodology.

The formative evaluation strategy was then presented. It described the concept of formative evaluation and the methods for quality assurance that were utilized during the project. This section also presents the COBRAS II developmental timeline.

The report described the COBRAS II BSE design parameters and the thought processes used to design the program. In the same section, the report discussed the identification of training objectives through the ModSPA process and the development of the scenario. Because the COBRAS II BSE was constructed as an expansion and enhancement of the COBRAS I exercise, most of the design and development description is in terms of how the original work was adapted. The COBRAS I work and products are themselves covered in Appendix B.

One section then detailed the major formative evaluation activity for the BSE, the trial implementation in Fort Lewis with 3 Bde, 2 ID in December 1996. This section also contained detailed summaries of the formative evaluation data collection and descriptions of the TSP and scenario modifications that resulted.

A single section contains details about COBRAS II vignette design, development, pilot implementation, and quality assurance reviews. As with the BSE, vignette development processes were modeled on the COBRAS I efforts. One significant outcome, in addition to the vignette TSPs, is a methodology guide for development of small group staff exercises such as the vignettes.

The report concludes by presenting lessons learned during the course of the project and discussing future development needs. The lessons have a general applicability and highlight the important issues that surfaced during the program's design, development, and formative evaluation. Several of the suggested expansions to the program are already underway in COBRAS III and ISAT.

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APPENDIX A

ACRONYMS and ABBREVIATIONS

A2C2	army airspace command and control
AA	assembly area
AAR	after action review
AC	active component
AD	area defense
ADA	air defense artillery
ADCOORD	air defense coordinator
AGMB	Advance Guard Main Body
ARI	Army Research Institute
ARTEP	Army Training and Evaluation Program
AVN LNO	aviation liaison officer
BBS	Brigade/Battalion Battle Simulation
BBSE	Brigade and Battalion Staff Exercise
Bde	brigade
BG	brigadier general
BOS	battlefield operating system
BSE	Brigade Staff Exercise
C3	command, control, and communication
CALL	Center for Army Lessons Learned
Cdr	commander
CHEMO	chemical officer
CITT	Commander's Integrated Training Tool for the Close Combat Tactical Trainer
Co	company
COA	course of action
COBRAS	Combined Arms Operations at Brigade Level, Realistically Achieved Through Simulation
COL	colonel
CP	command post
CS	combat support
CSS	combat service support
CTC	Combat Training Center
DA	Department of the Army
DATK	deliberate attack
DDMP	deliberate decision-making process
DIV	division
DS	direct support

ENG	engineer
EXCON	Exercise Control
FASCAM	Family of Scatterable Mines
FM	field manual
FSB	forward support battalion
FSO	fire support officer
FSCoord	fire support coordinator
FTX	field training exercise
FXXITP	Force XXI Training Program
G1	division adjutant
G2	division intelligence officer
G3	division operations officer
G4	division supply officer
HICON	Higher Control
HumRRO	Human Resources Research Organization
ID	infantry division
IPB	Intelligence Preparation of the Battlefield
IPR	in-progress review
ISAT	Implementation Support and Assessment Team
Ldr	leader
LTC	lieutenant colonel
METT-TC	mission, enemy, terrain, troops, time available, and civilian considerations
MG	major general
MI	military intelligence
ModSPA	modified staff performance analysis
MP	military police
MTC	movement to contact
MTP	Mission Training Plan
NCO	noncommissioned officer
NG	national guard
NTC	National Training Center
OIC	officer in charge
O/C	observer/controller
OPFOR	opposing force
OPORD	operations order
OPS	operations

PAM	pamphlet
Plt	platoon
R&D	research and development
RTO	radiotelephone operator
S1	adjutant
S2	intelligence officer
S3	operations and training officer
S4	supply officer
SIGO	signal officer
SIMNET	Simulation Networking
SME	subject matter expert
SOP	standing operating procedure
SOW	statement of work
SPA	staff performance analysis
STARTEX	start of exercise
STRUCCTT	Structured Training for Units in the Close Combat Tactical Trainer
TAC	tactical command post
TACSOP	tactical standing operating procedure
TF	task force
TOC	tactical operations center
TOE	table of organization and equipment
TRADOC	U.S. Army Training and Doctrine Command
TSP	training support package
USAARMC	U.S. Army Armor Center
USAARMS	U.S. Army Armor School
VTP	virtual training program
WARNO	warning order
XO	Executive Officer

APPENDIX B

FOUNDATIONS: OVERVIEW OF THE COBRAS I PROGRAM

The original Combined Arms Operations at Brigade Level, Realistically Achieved Through Simulation (COBRAS) program consisted of a Brigade Staff Exercise (BSE) and a set of brigade staff vignettes. It was developed at Fort Knox, Kentucky by the U. S. Army Research Institute for the Behavioral and Social Sciences' (ARI) Armored Forces Research Unit, with the assistance of the same consortium of contractors that was responsible for developing the expansion. The COBRAS I exercises provided the models from which the expansion exercises would be designed, and in this way, served as a test-bed for furthering the assembly of the Force XXI training regimen.

This appendix provides a concise description of the COBRAS I exercises and some discussion of key development processes. The intent is to provide the background necessary for understanding the COBRAS II project's development processes and outcomes, given that most of these processes and outcomes were based on activities of the COBRAS I project. The two major topics of the section are:

- *The COBRAS I Brigade Staff Exercise*: Provides a description of the original BSE and key development processes, including the development of training objectives.
- *The COBRAS I Brigade Staff Vignettes*: Provides a description of the original set of vignettes as they existed at the conclusion of the COBRAS I project and presents the key development processes.

The COBRAS I Brigade Staff Exercise

The BSE is a multi-mission, large-scope practice exercise that focuses on the interactions among the brigade commander and his staff as they conduct planning and employ brigade assets. This focus was selected due to indications that the brigade commander and his staff need structured practice opportunities to achieve proficiency in basic brigade operations of planning and synchronizing assets. The program, as designed, gives the commander and his staff a chance to practice the tasks they should perform as they fight the brigade in the particular battles of a structured scenario. Within a simulated Brigade/Battalion Battle Simulation (BBS) combat situation, they must determine what has to be done on the battlefield, who does it, and how their actions are linked to actions of other units and battlefield operating systems (BOS).

This description of the BSE describes four key aspects of the exercise:

- the training audience,
- the training objectives and their development,
- the exercise implementation model, and
- the structure and composition of the training support package (TSP) that includes all the information required to implement the exercise.

Training Audience

The target training audience was operationally defined as those participants for whom training objective task lists would be generated, observers would be assigned, and after action review (AAR) sessions would be provided. The target audience included the brigade commander, the brigade primary staff (i.e., Executive Office [XO], Adjutant [S1], Intelligence Office [S2], Operations and Training Officer [S3], Supply Officer [S4], and Fire Support Officer [FSO]), and the special staff who serve as links between the brigade and four of its systems (i.e., fire support, air defense, engineering, and logistics). These linking personnel were determined to be the following:

- the air defense coordinator (ADCOORD), the air defense artillery (ADA) battery commander,
- the engineer (ENG) battalion commander,
- the forward support battalion (FSB) commander, and
- the fire support coordinator (FSCoord), the direct support (DS) artillery battalion commander.

Training Objectives and Tasks

One of the most defining features of the COBRAS I BSE is its set of exercise performance objectives and tasks. With a focus on the planning and synchronization of brigade assets, as well as a special emphasis on combat service support (CSS) functions, the BSE performance objectives cover a wide range of staff activities. These activities are summarized in four general staff performance objectives:

1. Performance of the full mission requirements of planning, preparation, and execution (including consolidation, reorganization, and planning for follow-on missions).
2. Performance of both the deliberate decision-making process (DDMP⁹), performed without time pressure, and a modified decision-making process,¹⁰ performed under time constrained conditions.
3. Complete production of planning and preparation products, including interim products and inputs.
4. Integration of selected combat support (CS) and CSS functions into the staff processes of planning, preparation, and execution.

These objectives are supported by arrays of brigade staff tasks that are specified for each of the 11 members of the target training audience for each of the three missions—a total of 33 task

⁹ During the period of time in which COBRAS I development proceeded, the decision-making process was titled “Deliberate Decision-Making Process” (DDMP). Later, during the COBRAS II project, the name was officially changed to the “Military Decision-Making Process.”

¹⁰ The process called “Modified Decision-Making” in the COBRAS I work was referred to variously as the abbreviated or accelerated decision-making process in Field Manual (FM) 71-3 (Department of the Army [DA], 1995) and the combat decision-making process in FM 101-5 (DA, 1997).

lists. The tasks are consistent with current doctrine, as defined by Army manuals such as Army Training and Evaluation Program (ARTEP)–Mission Training Plan (MTP) and Field Manual (FM) publications, but are not constrained to the contents of these documents. Rather, the tasks include living, innovative, and adaptive tasks, which are descriptions of behaviors that underlie successful and exemplary performance. During the project, the cumulative domain of these behaviors was termed, “undocumented tasks,” to differentiate them from the mainstream, primarily ARTEP-based, documented tasks.

The methodology used to identify the COBRAS tasks was entitled the Staff Performance Analysis, or SPA. The methodology employed roleplay enactments of the BSE’s missions and subsequent probing activities to determine the activities of the commander and staff during the BSE’s particular missions. Tasks identified during the SPA met certain criteria based on project objectives. These criteria included the following:

- **Content relevance:** Performance was defined by the mission, enemy, terrain, troops, time, and civilian considerations (METT-TC) of three specific missions. Unlike existing generalizable performance descriptions, the SPA and its outcomes (i.e., tasks) were to be specific to COBRAS METT-TC.
- **Functional emphasis:** Developers documented the processes during each mission phase (planning, preparation, executing the mission, and conducting consolidation and reorganization) in specific functional areas: command and control, CSS, fire support, air defense, mobility/countermobility/survivability, intelligence, and maneuver. The cells in the matrix formed by the overlay of these two domains (mission phase X functional area) were to serve as a structure for identifying tasks.
- **Interactive criticality:** Special emphasis was placed on identifying activities which require interactions between pairs or groups of training audience members.
- **Observability:** Tasks were to have observable processes, products, or outcomes. Because the training process emphasized the contributions of observers who would coach and provide feedback, it was necessary that observable task indicators be identified. Important as they are, performance requirements such as reasoning, thought processes, and knowledge cannot be readily coached and evaluated during performance unless there are observable outcomes.
- **Brigade staff process focus:** The focus of performance for the training participants is only on their roles within the conduct of staff processes. This is especially significant in the situations of those individuals who have command responsibilities in addition to brigade staff responsibilities. For example, the brigade ENG is also the commander of the engineer battalion, but tasks involving the command of his battalion were not to be addressed.

The Exercise Implementation Model

The implementation model can be defined in terms of four exercise aspects: participants, simulation site layout, preparation for the exercise, and conduct of the exercise. The discussion below describes these aspects to depict how the BSE is implemented.

The exercise participants. The BSE, as designed, requires a total of 102 participants, in addition to the 11 included in the target training audience. These participants fill roles ranging from high-level exercise management, to the roleplaying of subordinate unit staffs, to operating BBS. Additional participants may be inserted into any of the role types, but decreasing the exercise staff may reduce the training benefit of the brigade staff. The types and positions of the participants prescribed for implementation are provided in Figure B-1. Figure B-2 presents brief descriptions of each participant type.

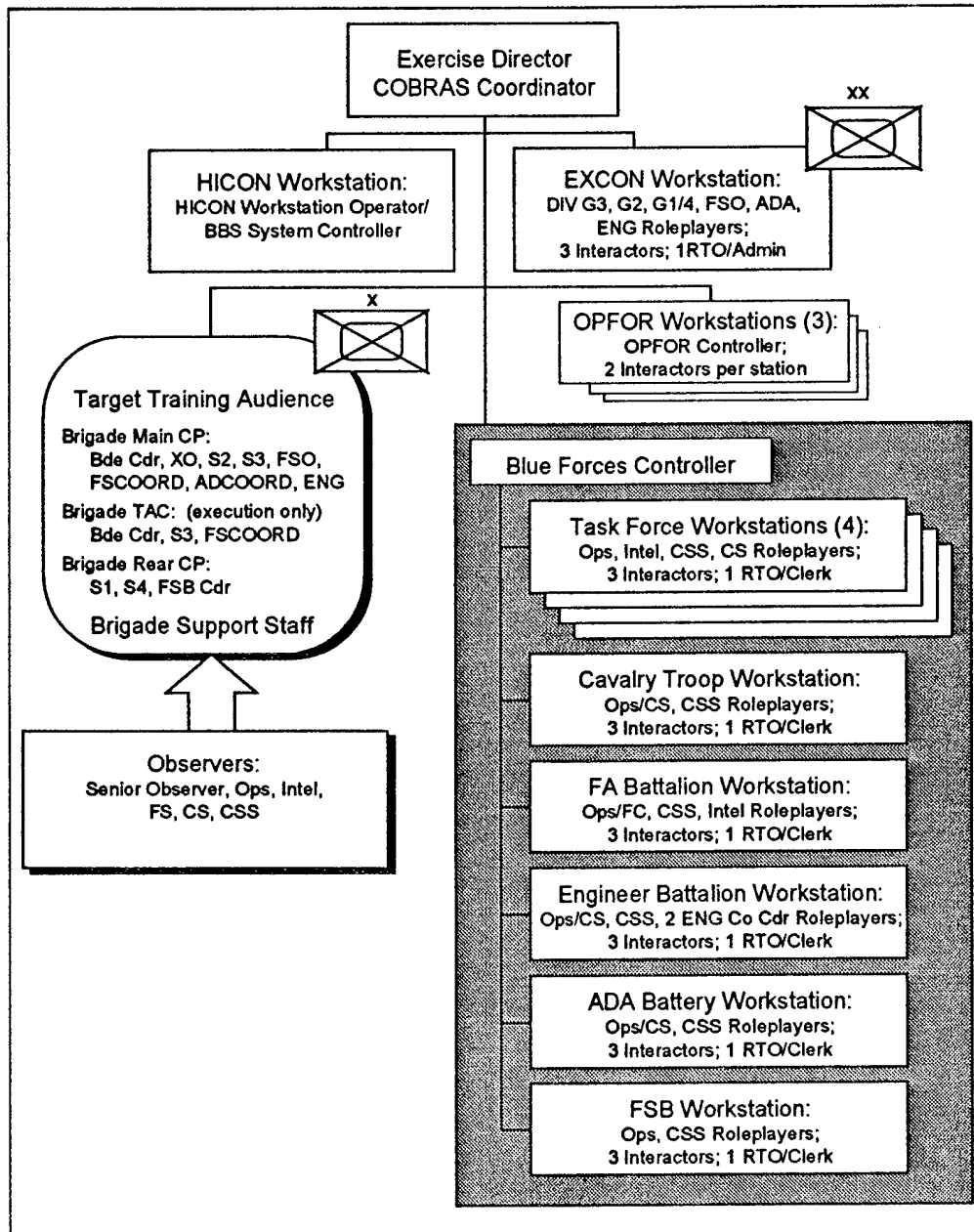


Figure B-1. Locations of exercise participants in the COBRAS I Brigade Staff Exercise.

Role	Responsibility
Exercise Management	<p>Senior military personnel fill the exercise management positions.</p> <ul style="list-style-type: none"> • The Exercise Director provides overall leadership and is involved in every decision that may affect the ability of the training exercise to meet the training objectives. • The Exercise Director's primary assistant, the COBRAS Coordinator, coordinates and arranges for personnel, supplies, and equipment in preparation for the training. The COBRAS Coordinator is also available during training to assist the Exercise Director and to keep him informed of the course the training is taking. • The Blue Forces Controller monitors all activities regarding the operation of the simulation for Blue Force units.
Observers	<p>The observers provide feedback to the target training audience regarding their performance. Feedback is provided in a series of after action review (AAR) sessions and during execution in the form of the coaching of individual training audience members. The Senior Observer is the leader of the observer team. His responsibilities include facilitating AARs, adjusting observer assignments, and serving as an advisor to the Exercise Director on how the exercise is going and implementing solutions.</p>
Roleplayers	<p>Subordinate and Supporting Units: The major elements of the brigade are portrayed by personnel of the brigade's subordinate and supporting units, performing the duties of the functions and units to which they are normally assigned.</p> <ul style="list-style-type: none"> • Exercise Control (EXCON): EXCON roleplayers play the roles of key division staff positions. They dispense scripted and hard copy messages intended to maintain the integrity and flow of the scenario to support the training objectives. In doing so, the EXCON roleplayers cause the occurrence of significant events that cue staff actions. In addition, the EXCON roleplayers respond to questions and requests from the brigade staff using prepared guidelines. • Opposing Force (OPFOR): The OPFOR Controller is the roleplayer who directs the actions of the OPFOR following the intent of the exercise and situation-specific guidelines. His purpose is to provide the cues to stimulate performance of the training objectives by the brigade staff. He works with Brigade/Battalion Battle Simulation (BBS) interactors at three workstations.
BBS Interactors	<p>Interactors operate the computer terminals that control BBS. Their role is to translate the tactically-oriented instructions provided by roleplayers into BBS computer commands. Interactors also construct and print out tactical, logistical, and status reports of the units.</p>
Brigade Staff Support	<p>These personnel fill the positions they normally occupy to support brigade staff functions. They include staff assistants, radiotelephone operators, etc.</p>
HICON	<p>The Higher Control (HICON) Operator, who operates the HICON workstation, performs certain simulation operations that are not executable by roleplayers and interactors located at other workstations. The HICON Operator is a member of the simulation site staff. He/she designates other members of the staff to conduct interactor and roleplayer training on BBS and to oversee and facilitate overall operation of the simulation.</p>

Figure B-2. Role descriptions of COBRAS I Brigade Staff Exercise participant types.

Simulation site layout. As stated above, the BSE is implemented within the confines of the BBS.¹¹ The training is conducted using three simulated command post (CP) locations (the tactical [TAC] CP, the main CP, and the rear CP) for the brigade staff and either 10 or 14 BBS workstations. All CPs and BBS workstations are linked by radio communications representing eight brigade nets.

During BSE execution, the participants, including the primary training audience, are located according to their functions in the exercise, and as required by the simulation layout. Their placement was dependent upon satisfying the notion that they should be in the location that best facilitates the performance of their roles. Figure B-3 portrays a typical simulation center setup and layout of work areas for the BSE, and indicates the locations of the participant types. Note that the exercise management personnel do not have designated locations from which to work. The Exercise Director usually spends the majority of his/her time in the CPs or Exercise Control (EXCON) workstation, and the Blue Forces Controller spends most of his/her time in and around the subordinate and supporting unit workstations.

Preparation for the exercise. The planning and preparation for an implementation of the BSE begins with the brigade learning about and deciding to conduct the exercise, entering the exercise in their training calendar, and scheduling the BBS facility for the exercise. All subsequent activities in this phase should begin approximately 18 weeks prior to the exercise conduct. The planning and preparation process timeline shown in Figure B-4 is extracted from the *Exercise Guide*, a key portion of the TSP—described below. It indicates the primary decision and coordination activities that should occur during the weeks prior to actual implementation.

Conduct of the exercise. Conduct of the BSE requires the brigade staff, exercise management personnel, and roleplayers to be familiar with the tactical situation of the first mission to be conducted, and the simulation and its operators (i.e., interactors) to be prepared for their functions. The initial event in the exercise is the delivery of a division order by the EXCON roleplayers and Exercise Director. This event sets the brigade's planning process in motion.

The activities of the exercise conduct include the planning, preparation and execution phases of the mission(s), and a series of AARs that are organized to address, in a sequential manner, the segments of the mission(s) conducted. Thus, the prime determinant of the content of the exercise is the mission(s) selected for the exercise. Depending on the mission(s) selected, the brigade will train either on the DDMP, the modified decision-making process, or both. The scenario allows for six viable¹² mission implementation options, catering to the training needs of individual brigades. The six viable options are portrayed in Figure B-5.

¹¹ This simulation was chosen over Janus, Simulation Networking (SIMNET), and distributed interactive simulations (i.e., an environment in which either Janus or BBS is linked electronically to SIMNET) because of its capabilities to satisfy five criteria: functional representation, the size of the terrain database, the ability to generate combat report information, operator requirements, and brigade asset representation.

¹² Other performance sequences are illogical because they do not support the concepts in which the program is grounded, including leveraged use of simulation and a focus on designated training objectives.

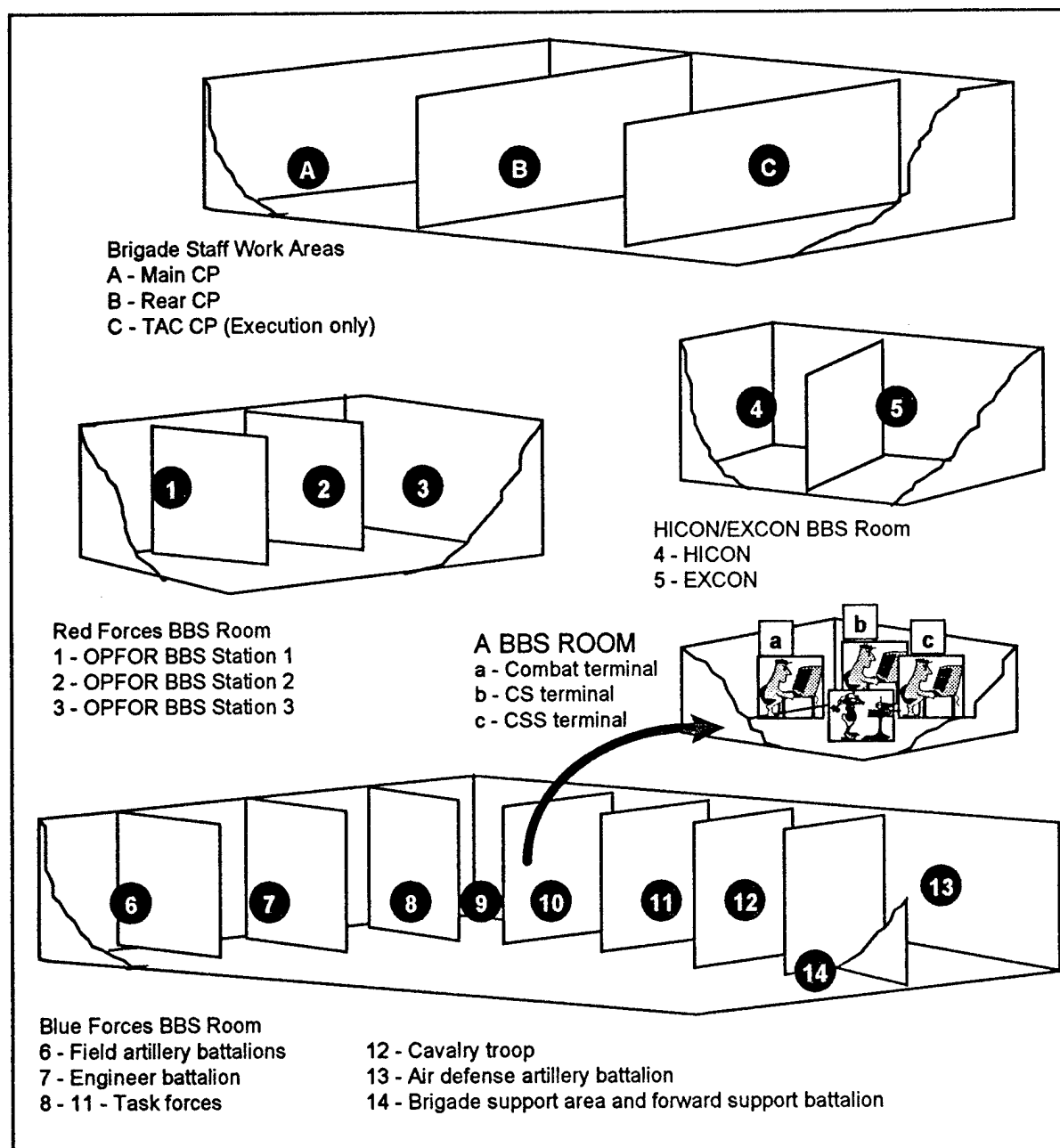


Figure B-3. Layout of work areas for the Brigade Staff Exercise.

Timing	Activity
T-18 weeks	<p>Division Operations (G3) designates personnel to serve as Exercise Director and COBRAS Coordinator.</p> <p>Exercise Director and Brigade Commander meet to discuss roles and expectations.</p>
T-14 weeks	<p>Exercise Director and Brigade Commander select option for mission(s) to conduct.</p> <p>Exercise Director develops preliminary exercise schedule.</p>
T-12 weeks	<p>COBRAS Coordinator prepares taskings for personnel; released to units.</p> <p>COBRAS Coordinator confirms facilities schedule.</p>
T-4 weeks	<p>COBRAS Coordinator issues participant guides and readahead materials to:</p> <ul style="list-style-type: none"> • Training audience (through Brigade XO) • Exercise Control (EXCON) G3 Roleplayer • Opposing Force (OPFOR) Controller • Observers
T-2 weeks	<p>COBRAS Coordinator issues guides and read-a-head materials to Blue Forces roleplayers.</p> <p>Simulation site personnel load and try out Brigade/Battalion Battle Simulation (BBS) tapes.</p> <p>Orientation briefing for all participants.</p> <p>Brigade Commander and staff study readahead materials and references and get familiar with the tactical situation.</p> <p>Brigade Commander and XO decide on support staffing.</p> <p>Brigade XO arranges for copies of the overlays to be made.</p> <p>Brigade Intelligence Officer (S2) uses readahead materials to begin Intelligence Preparation of the Battlefield (IPB).</p>
T-3 days	<p>Simulation site personnel and Blue Forces Controller train and rehearse interactors and roleplayers.</p> <p>Roleplayers and training audience set up their command posts in the exercise area.</p> <p>Division (EXCON) roleplayers rehearse division order with observers.</p> <p>Exercise Director and COBRAS Coordinator conduct final readiness check of exercise support.</p> <p>Brigade Commander and XO conduct final readiness check of brigade staff.</p>

Figure B-4. Planning and preparation timeline for COBRAS I Brigade Staff Exercise implementation.

Option	Description
1: MTC → AD → DATK	Permits the brigade's planning process to begin before hostilities and continue throughout the three missions, and requires the brigade to use both the deliberate decision-making process (DDMP) and the modified decision-making process. This option provides the most robust opportunity to practice combat service support (CSS) tasks. The CSS activity influences the operation from the time the brigade begins its transition from the field training exercise to combat, and continues through the completion of the deliberate attack (DATK).
2: MTC → AD	Starts with the movement to contact (MTC), transitions to the area defense (AD), and ends when the brigade has completed its defenses, consolidated its forces, and knows the status of its units. Both the DDMP and the modified decision-making process will be practiced, and CSS activities are ongoing. The brigade's posture at the beginning of the AD depends on its losses in the MTC and on the resupply and replenishment that take place during the transition.
3: MTC	Provides a logical entry into the exercise, with brigade units performing reorganization activities and reporting their status as the staff plans the mission using the DDMP. The exercise ends when the enemy advance guard main body breaks contact and assumes a temporary defense.
4: AD → DATK	<p>The AD starts with the brigade still in limited contact with the enemy following the MTC. The brigade's readiness posture represents what a brigade could expect following a MTC. This condition will require the brigade to rapidly assess its combat capability and conduct the resupply, replenishment, and other CSS activities to prepare for the AD mission. The time available demands that the brigade use the modified decision-making process to plan the AD.</p> <p>This option is useful when the brigade does not wish to train on the MTC. It is a difficult starting point, however. The participants must be fully read into the scenario and be ready to take control at a point when the brigade is very active.</p>
5: AD	The initial conditions are the same as for option 4, with the brigade just completing the MTC. As with option 4, the entry point for this option will offer a considerable challenge to the brigade staff. The modified decision-making process must be used to plan the AD. The mission continues, terminating as the brigade consolidates its forces as in option 2.
6: DATK	The brigade has (notionally) completed the MTC and AD missions and is located in an assembly area. Its readiness posture is representative of a unit that has fought the previous two missions. The CSS activities are ongoing as the brigade continues planning (using the DDMP) and preparations for the attack and replenishes and improves its combat readiness. The exercise terminates as the brigade seizes its objective and consolidates, before replenishment and repair which would precede the next mission.

Figure B-5. The six implementation options for the Brigade Staff Exercise.

When option 1 (from Figure B-5) is selected, the BSE requires 14 8-hour days. The other options will decrease the length of the exercise, but will also decrease the extent to which the staff can practice their decision-making process.

The BSE AARs are designed to be conducted by the Senior Observer throughout the exercise, with an AAR for each segment of the mission, as defined in Figure B-6. After each

segment, one hour is set aside for an AAR involving the brigade commander and his staff as the primary audience. The AAR discussions focus on the strengths and weaknesses of the staff process. During the AARs, observers guide the staff to recognize their weaknesses and direct them toward the “discovery” of alternative, more correct actions as outlined by the DDMP, the modified decision-making process, and the COBRAS tasks. The AAR materials help establish the link between staff performance in the just-completed exercise segment, and the outcomes of the prior segment(s).

Movement to Contact Segments	Area Defense Segments	Deliberate Attack Segments
Mission Analysis		Mission Analysis
COA Development	Modified Decision-Making Process Planning	COA Development
Wargaming		Wargaming
COA Comparison		COA Comparison
Orders Preparation	Orders Preparation	Orders Preparation
Rehearsal	Rehearsal	Rehearsal
Mission Execution	Mission Execution	Mission Execution
Consolidate/Reorganize		

Figure B-6. Exercise segments corresponding to scheduled after action reviews.

Every aspect of the exercise conduct phase, as well as the preparation phase, is documented in the BSE’s TSP. That is, the TSP contains all the information and instructions needed to conduct the exercise. Below, the BSE TSP is described, in terms of its organization and contents.

The BSE TSP

The basic structure or organization of the BSE TSP was designed to account for all six implementation options described in Figure B-5. That is, there is not a separate TSP for each option. Rather, the TSP consists of a single set of guides, books, and simulation system tapes that contain both instructions and materials required for all implementation options. Upon the selection of any implementation option, a brigade can select, assemble, and distribute those materials needed for that option. The TSP provides the guides and materials for each training participant, appropriate for his/her role in the exercise.

A detailed description of the contents of the TSP can be found in Graves, Campbell, Deter, and Quinkert (1997). A broad overview of the organization of the TSP, however, is provided in Figure B-7, and a brief outline of the contents, is presented in Figure B-8.

TSP Category	TSP Item
Exercise Management	<ul style="list-style-type: none"> Exercise Guide for the Exercise Director, COBRAS Coordinator, and Blue Forces Controller, with Appendixes
Tactical Materials	<ul style="list-style-type: none"> Corps Concept (MTC, AD, and DATK) Division Order and Tactical Materials (including overlays) Scripted and hard-copy messages
Participant Guides and Materials	<p>Training Audience:</p> <ul style="list-style-type: none"> Training Audience Guide (generic, for all 11 Primary Training Audience members) Initial Situation Packages and start of exercise (STARTEX) Position Overlays (per staff member, per mission) Task Lists (per staff member, per mission) <p>Observers:</p> <ul style="list-style-type: none"> Observer Guide (generic, for all 6 Observers) Task Lists (per Observer, per mission) Observer AAR Briefing Materials <p>Roleplayer Teams:</p> <ul style="list-style-type: none"> EXCON Roleplayer Guide Task Force 1-5 Roleplayer Guide Task Force 1-7 Roleplayer Guide Task Force 3-5 Roleplayer Guide Task Force 1-80 Roleplayer Guide Brigade Support Area Roleplayer Guide OPFOR Controller Guide Cavalry Troop Roleplayer Guide Fire Support Roleplayer Guide Engineer Battalion Roleplayer Guide Air Defense Artillery Roleplayer Guide Initial Situation Packages and STARTEX Position Overlays (per roleplayer team, per mission) <p>BBS Interactors:</p> <ul style="list-style-type: none"> Blue Interactor Guide Red Interactor Guide HICON/EXCON Interactor Guide
Simulation Materials	<p>Tools for initializing BBS and making changes or corrections:</p> <ul style="list-style-type: none"> BBS TOE and Initialization Book BBS Archive Book BBS System Tapes

Figure B-7. Organization of the Brigade Staff Exercise training support package.

Material for...	Includes...	
Exercise Managers	<ul style="list-style-type: none"> A planning and preparation timeline Guidance on selecting missions Guidance on long-term planning and preparation Guidance on near-term preparation 	<ul style="list-style-type: none"> Guidance on controlling the training Mission-specific exercise information Information on implementation model Division orders
Training Audience	<ul style="list-style-type: none"> Preview of exercise and its intent Information on audience composition Performance objectives Description of observers and after action reviews 	<ul style="list-style-type: none"> Guidance on exercise preparation Road to war Initial situation materials Task lists
Roleplayers (Subordinate and Supporting Units, Exercise Control [EXCON], Opposing Force [OPFOR])	<ul style="list-style-type: none"> Preview of exercise and its intent Guidance on exercise preparation Guidance on exercise conduct Workstation task lists Simulation operating procedures Information on communications Road to war <i>Subordinate and supporting units:</i> Planning guidance and job aids Initial situation materials 	<ul style="list-style-type: none"> <i>EXCON:</i> Information on distribution of tactical materials Scripted messages Response guidelines Information on division and higher assets Division orders <i>OPFOR:</i> Exercise and role overview OPFOR story line and training plan Mission-specific scenario descriptions OPFOR Controller tasks Senior Observer responsibilities Division orders Task lists
Observers	<ul style="list-style-type: none"> Exercise and role overview Information on exercise preparation Information on exercise conduct 	<ul style="list-style-type: none"> Senior Observer responsibilities Division orders Task lists
Interactors (Blue and Red)	<ul style="list-style-type: none"> COBRAS rules of engagement Information on naming units/icons Information on operational states Job aid for reporting combat service support information Information on Brigade/Battalion Battle Simulation (BBS) menus 	<ul style="list-style-type: none"> Addendum to the BBS 4.0 Warfighter's Guide (National Simulation Center et al., 1994) Force description materials Initialization instructions Execution materials (<i>Red only</i>)
Simulation Site Staff	<ul style="list-style-type: none"> Modified table of organization and equipment Information on initializing the Brigade Staff Exercise (BSE) Instruction on archive tapes 	<ul style="list-style-type: none"> Information on assigning units to workstations Information on graphic control measures Information on roleplayer and interactor training for the BSE

Figure B-8. Description of the Brigade Staff Exercise training support package contents.

The Brigade Staff Vignettes

The COBRAS I brigade staff vignettes are short, structured, self-contained training activities. Each vignette focuses on a specific staff process event and on specific members and groupings of the brigade staff. Each vignette's activities are a "snapshot" of a segment of the entire staff process. They represent extracts of activities that are normally performed by the staff in a context-rich situation. That is, the vignettes lift discrete events out of the context in which they are normally found and, for training purposes, treat them in isolation.

Providing "Thursday morning" practice opportunities is the key to the vignettes' value to a brigade. Each vignette sets up an environment in which selected members of the brigade staff can focus on the performance of the activities required by individual segments of the plan, prepare, and execute processes. Vignettes are well suited for the intangible aspects of staff processes, including integration, coordination, synchronization, and the establishment of roles and associations. They require relatively little time to prepare for and execute (e.g., one to two days).

This section describes four key aspects of the vignettes:

- the structure of the set of vignettes,
- the training objectives and tasks,
- the implementation model, and
- the structure and composition of the TSP that includes all the information required to implement the vignettes.

The Structure of the Set of Vignettes

During the COBRAS I project, developers produced thirteen vignettes. Two of the vignettes were simulation-based, and were not completed during the COBRAS I effort. This discussion focuses primarily on describing the 11 live simulation-based vignettes.

Vignette scenarios were derived from the scenario storyline that underlies the BSE. The vignette scenarios differ from the scenario of the BSE, however, in that each vignette's scenario was modified, as necessary, to support the specific training objective of the vignette. That is, each vignette scenario sets up the tactical situation that requires the participation of a selected group of the brigade staff members in a well-delineated event.

In addition to scenario design, vignette construction also required determination of training participant groups. Although the training audience of 11 members of the brigade staff had been identified, each vignette required additional definition of the particular small group that would participate. In practice, the selection and design of scenario events and the determination of training audience personnel were inseparably linked. Together, the two design parameters defined the scope of the vignette; that is, the mission "slice" that would be the vignette situation.

Defining the vignette scope involved an initial tentative choice of event and participants, followed by gradual refining and shaping of vignette structure. This shaping process required developers to go through a four-step process (with multiple iterations):

1. Analyze the events and activities before, during, and after the selected event.
2. Analyze and document the inputs and outputs of that extended event context.
3. Document all of the participants in each separable segment of the extended event context.
4. Finally, draw “the line” between activities and participants that will be in the vignette itself, and those that will not be part of the vignette.

For any given vignette, the products of these four steps were continually modified during development. The process eventually yielded the vignette titles and designation of training audience members shown in Figure B-9.

Vignette Title	Training Audience
1: Plan for Dislocated Civilians	S1, S2, S4
2: Plan Refuel on the Move	S4, FSB Commander
3: Develop a Concept of Service Support	S1, S4
4: Develop Reconnaissance and Surveillance Plan	S2, S3
5: Conduct Target Development	XO, S2, S3, FSO
6: Develop Air Defense Concept	S2, S3, ADCOORD
7: Develop Contingency Plan	S2, S3, FSO, ENG
8: Conduct Mission Analysis	XO, S1, S2, S3, S4, FSO, ENG, ADCOORD
9: Develop Courses of Action	XO, S1, S2, S3, S4, FSO, ENG, ADCOORD
10: Conduct Course of Action Analysis	XO, S1, S2, S3, S4, FSO, ENG, ADCOORD
11: Conduct Special Staff Rehearsal	XO, S2, S3, FSO, ENG, ADCOORD

Figure B-9. Titles and training participants for the COBRAS I vignettes.

The events of the COBRAS I vignettes highlight selected aspects of the staff planning process. These 11 events are based on the requirements outlined in the DDMP as described in FM 101-5 (DA, 1997). They are executed in a live training environment. By using this type of simulated environment, resource costs are kept low, and the training becomes more accessible for brigade staff development.

While there is a performance logic to the vignettes, a sequence was not part of the design. The content reflects planning requirements, followed by the steps in the tactical decision-making process. This is the sequence in which they are listed in Figure B-9. But the vignettes do not build on each other or rely on input from preceding vignettes. Each vignette can be conducted independently of other vignettes.

Vignette Training Objectives and Tasks

The focus in the vignettes is on the performance of the participant group, rather than on the isolated performance of any individual members. Performance descriptions, which eventually became the training objectives and tasks, were produced from the results of the SPA (described earlier). That is, the SPA task lists were examined and aggregated across persons in order to produce group performance descriptions.

The vignette task lists serve two purposes: They give the training participants a preview of the performance expectations for the vignette, and they give the Training Coordinator (described below) a guide for observing and coaching the participants.

The Vignette Implementation Model

As with the BSE, the implementation model for vignettes is described in terms of participants and their roles, preparation, and conduct.

Vignette participants. The vignettes are designed to be conducted by brigade personnel and within brigade resources. A designated Training Coordinator is responsible for preparing and conducting the vignette. The other participants represent the training audience and their supporting staff.

The Training Coordinator position is usually filled by the brigade XO. The XO has the overall responsibility for training and overseeing the staff. Additionally, he is the most senior and most experienced person on the staff. He has a vested interest in how the staff conducts itself, both individually and in coordination with each other. The Training Coordinator is responsible for the overall accomplishment of the vignette. He/she must organize all of the participants and brief them on their roles. They must understand all aspects of the vignette, including the training emphasis, tactical background, and the AAR process. The specific duties of the Training Coordinator include the following:

- scheduling the training,
- preparing the participants for training,
- observing and coaching during training, and
- facilitating the AAR.

The other participants include the specific vignette training audience members, as shown in Figure B-9, and additional personnel from staff sections. These section personnel are included at the discretion of the XO and training audience members, in order to provide realistic assistance to the training audience and to broaden the training value provided.

When the XO is a member of the training audience, he is generally performing as an overseer, coordinator, and synchronizer of the staff process. He also functions to establish and

enforce staff procedures. These functions are compatible with the role of the Training Coordinator and can be performed concurrently.

Vignette preparation. While the planning for the conduct of a vignette is accomplished by the Training Coordinator, there are preparation activities for all of the participants. These activities are outlined in Figure B-10.

Planning and Preparation Activities for the Training Coordinator	
Schedule the training	Schedule dates and times for an administrative brief, participant preparation, and vignette execution.
Select the training site	The vignettes are performed in command post (CP) -like areas. A classroom is adequate; no separate staff work areas are required.
Notify participants	All participants should be notified well in advance of the time and location of the vignette conduct.
Conduct self-preparation	The Training Coordinator needs to read and understand the training support package (TSP) materials for the vignette to be conducted. This includes acquiring a solid knowledge of the tactical and after action review materials.
Conduct administrative brief	Once the vignette has been scheduled, the Training Coordinator assembles the participants to discuss their role, distribute participant materials, and inform them of the preparation activities they must complete prior to vignette execution.
Planning and Preparation Activities for the Training Audience	
Review the vignette	Review the scope, objective, and tasks of the vignette to understand the limits of the requirements and how the vignette activities fit into the entire staff process.
Review reference materials	Each training participant should consult the list of references included in the TSP and review those as necessary. The lists of references include referrals to current doctrine, techniques, and procedures relevant to what will occur in the vignette.
Read the tactical materials	Participants must be thoroughly familiar with the tactical materials before vignette execution. Each training audience member receives tactical materials commensurate with his/her role in the exercise.
Copy overlays to acetate	Paper copies of overlays must be transferred to acetate prior to the vignette's conduct.
Set up the training site	Participants should establish work areas, post overlays, and obtain any CP supplies and accessories that are normally required for the activities to be trained.

Figure B-10. Description of vignette planning and preparation activities.

Exercise conduct. The exercise conduct phase of the vignettes requires the Training Coordinator and other participants to be familiar with the tactical preparation materials. The initial event of the conduct phase is the situation brief, conducted by the Training Coordinator. In the situation brief, participants are provided any additional tactical information needed to conduct

the vignette, but not required for preparation (e.g., commander's guidance). Additionally, participants may ask questions during the brief regarding the scope of the vignette, limitations of the training environment, or performance expectations.

During the conduct of the vignette, the Training Coordinator is responsible for observing and coaching while the other participants perform the staff activities required by the vignette situation.

Following execution of the vignette, the Training Coordinator uses a prepared list of AAR questions to facilitate an AAR. The Training Coordinator can use any or all of the AAR questions, together with his own observations, to focus the AAR on specific performance issues. The accompanying considerations assist him to further focus the questions. They are not "correct" answers; rather, they specify the critical elements of each performance component. The training audience is not passive during the AAR, but should be proactive in directing the focus of the discussion into areas they identify as individual and staff group strengths and weaknesses. It is important to note that the focus of the exercise and the AAR is on staff functioning and not on the tactics of the brigade operation.

The Vignette TSPs

Because the vignettes were to be independent, stand-alone exercises, all of the background and instructions was to be provided to users without repeating the information in every vignette-specific component of the TSP. This was accomplished by gathering all of the general information into a single *Guide to Use and Implementation of Vignettes*, which serves as the training management component for the vignettes.

Individual vignette TSPs contain all of the necessary information for conducting that vignette. Each vignette TSP consists of a *Training Coordinator Guide*, which also contains tactical materials that are to be used during the vignette, and a *Training Participant Guide*, containing the tactical materials for use in preparation.

To help units implement the vignettes, individual vignette TSPs have similar structure and appearance. This was accomplished by using a standard vignette shell, to which vignette-specific information would be added. Of course, the differences among vignettes was such that the shell itself served more as an outline than as a template. The TSPs reflect this concept more in their content than in their organization. The structure and a general description of the contents of the vignette guides and training management component are presented in Figure B-11 and Figure B-12.

Material for . . .	Includes . . .
Vignette participants (contained in the vignette-specific <i>Training Participant Guide</i>)	<p>General orientation to the vignettes, as well as vignette-specific information:</p> <ul style="list-style-type: none"> • List of tasks • Description of the scope of the activity involved in the vignette • References • Preparation guidance <p>Tactical materials to be used during preparation may include orders, overlays, intelligence summaries, course of action descriptions, annexes, or decision matrixes, as appropriate to the vignette.</p> <p>Distributed to all primary participants (not “other” participants) during the Administrative Brief, several days before the vignette takes place.</p>
Training Coordinator (contained in the vignette-specific <i>Training Coordinator Guide</i>)	<p>General orientation, as well as specific guidance for preparation and conduct of the vignette:</p> <ul style="list-style-type: none"> • Administrative Brief for participants’ orientation • Description of participant preparation activities that the Training Coordinator oversees • Situation Brief to begin the vignette; may provide a tactical update or implementing instructions • Suggested processes for staff performance (job aids for participants) • Models of expected outcomes or products (sample products) • Information on organization and conduct of after action reviews • Staff process questions to facilitate the after action reviews <p>Supplements general guidance found in the <i>Guide to Use and Implementation of Vignettes</i>.</p>

Figure B-11. Description of contents of vignette training support package guides.

Guide Overview, Purpose and Scope of the Guide	
Introduction, Format, and Contents of the Guide	Tells how the Guide is organized and who to contact for more information.
Frequently Asked Questions About COBRAS Vignettes	
About Structured Training	COBRAS program description; definition of vignettes, structured training, and training support package (TSP); explains how vignettes are used.
About Vignette Content	Vignette activities, participants, and the training intent.
About Simulation	Simulation-based and “live” simulation vignettes.
About Support Requirements	Support requirements for simulation-based and “live” simulation vignettes.
About Managing Vignette Training	Roles and responsibilities of the brigade and the Executive Officer in implementing vignettes; duties of the Training Coordinator.
About Other Participants	Who else may or should participate.
About the Brigade Commander’s Role	Brigade commander as training leader and as participant.
About the TSP	Organization and content of the TSP materials; how to obtain more copies; about modifying vignettes for unit standard operating procedure and unit task organization; how to field tactical questions from participants.
About Site Requirements and Supplies	Supplies, overlays, maps, and physical site setup.
About Vignettes and Training Strategies	Relationship to the Brigade Staff Exercise and among vignettes; incorporating vignette training with other staff training.
About Time Requirements	Actual vignette time and preparation time, preparation activities.
About Training Feedback	Evaluation and feedback; source of vignette tasks and sample solutions; how to prepare for and conduct the after action review; coaching.
About Implementing	How to get started.

Figure B-12. Description of contents of vignette training management component.

APPENDIX C

BASIC METHODOLOGY FOR DEVELOPING STRUCTURED TRAINING

Structured training is a term applied to training programs that are deliberately and purposefully constructed so as to focus on specific training objectives (C. H. Campbell, Campbell, Sanders, Flynn, & Myers, 1995; C. H. Campbell & Deter, 1997; C. H. Campbell, Deter, & Quinkert, 1997). Development requires that attention be paid to the focus of the training, standardization of training events, and the construction of a training support package (TSP) that supports the focus and standardization. Attention to each of these aspects is incorporated in the methodology described in the above-referenced Army Research Institute-published guides. There are four phases to the development methodology, as shown in Figure C-1.

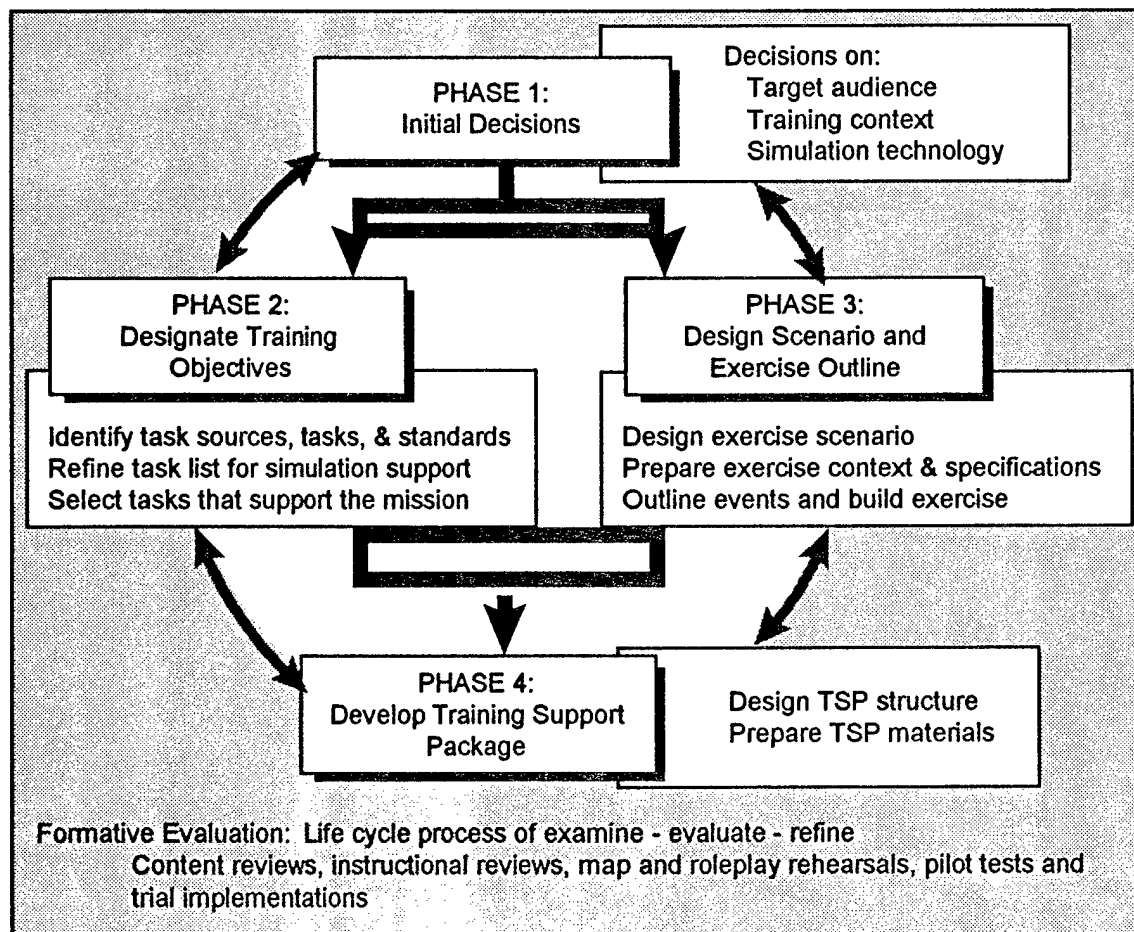


Figure C-1. The methodology for development of structured simulation-based training.

In Phase 1, developers specify the training requirement in terms of the content (e.g., mission and enemy type, terrain, time constraints, number of exercise start points, difficulty level), training audience (e.g., unit type or echelon, personnel within unit), and appropriate training environment (i.e., specific simulator/simulation).

Phase 2 and Phase 3 are usually concurrent activities, with a great deal of interaction between specifying the training objectives for the stipulated mission, and designing the scenario to prompt performance of the training objectives.

Finally, in Phase 4, developers construct and try out all of the written and simulator/simulation-based components of the training program, including materials for the trainers and for the participating unit. These materials are referred to as the TSP, which is critical to ensuring standardized implementation.

The entire design and development process is supported by formative evaluation activities. These include, but are not limited to, trial implementations of the emerging program and TSP. Formative evaluation is considered to be a continuous product improvement process that extends throughout the life of the development effort.

Methodology for Development of Structured Small Group Exercises (Vignettes)

The methodology that applies to development of vignettes is a variation of the basic methodology described above. Complete descriptions of the activities may be found in C. H. Campbell, Ford, and Campbell (in preparation). As with the basic process, there are four phases in the development of vignettes, as shown in Figure C-2.

In Phase 1, developers determine the vignette user (e.g., unit type or echelon, personnel within unit), vignette context (e.g., mission and enemy type, force organization, terrain, time constraints), appropriate training environment (e.g., specific simulator/simulation, command post, rehearsal site), and other constraints; tentatively identify audience and event; and specify the vignette architecture.

During Phase 2, the limits of the vignette are defined in terms of the mission, enemy, terrain, troops, time, and civilian considerations (METT-TC); the tactical framework for the vignette is generated; the scope of the vignette event is specified; and developers define and begin construction of the simulation-based or scripted materials.

In Phase 3, the critical performance requirements and standards for the selected audience and event are defined. These are eventually translated into the training objectives, task statements, and after action review questions.

During Phase 4, developers construct and try out all of the components of the training program, including materials for the trainers and for the participants and, as appropriate, the simulator/simulation-based components.

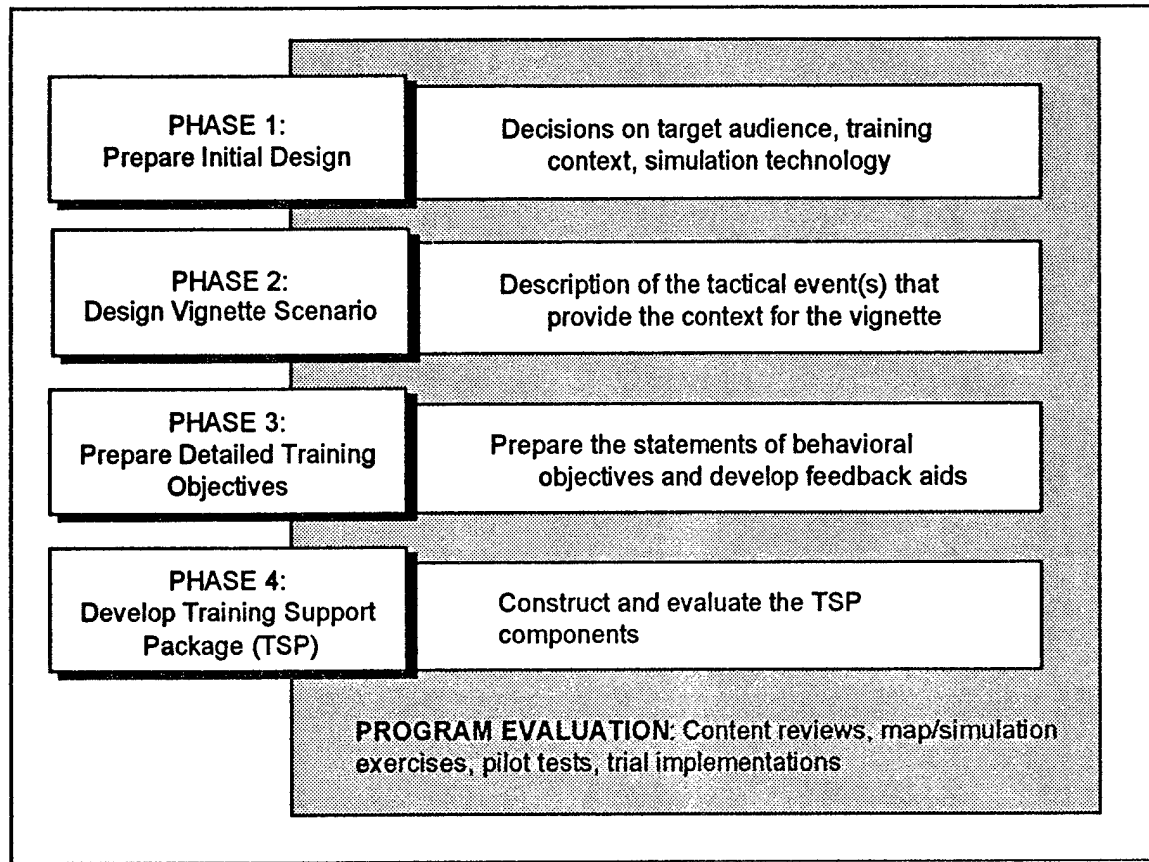


Figure C-2. The four phases in the methodology for development of structured vignettes.

These four phases are not done in a strictly linear fashion. There will be considerable overlap among the phases. For example, understanding of the initial decisions will change as more is learned about the training environment and the performance requirements; information that feeds into development of the TSP will be captured during documentation of initial decisions; and so on.

As with the basic methodology, the vignette methodology incorporates a series of required and critical *formative evaluation* steps throughout the development process. Some of these are formal activities (such as roleplay enactments of the vignette conducted by the design team, tryouts with representative individuals, technology-driven tryouts, or content reviews with experts and stakeholders), but formative evaluation also includes a continuous attention to the need for revisions and improvements. The purpose of formative evaluation, both the formal activities and the continuous revisions, is to insure the quality of the product by attending to quality throughout development. In Figure C-2, formative evaluation is shown as a process that underlies all of the design and development work. This continuous examine-evaluate-refine process, which derives from the formative evaluation attention, is what causes design and development to be non-linear.